

The Bourne Press, 3/11 Spring Road, Bournemouth

85

BOURNEMOUTH
NATURAL
SCIENCE
SOCIETY



PROCEEDINGS
1967-68

VOLUME LVIII

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Bournemouth Natural Science Society

List of Presidents (1903-1969)

1903—04	J. E. Beale (Mayor of Bournemouth)
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1906—07	H. J. Waddington, F.L.S.
1907—09	A. Ransome, M.A., M.D., F.R.C.P., F.R.S.
1909—10	A. Smith Woodward, D.SC., F.R.S., F.L.S., F.G.S.
1910—11	Dukinfield H. Scott, M.A., LL.D., F.R.S., F.L.S., F.G.S.
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1913—16	Sir Daniel Morris, K.C.M.G., J.P., M.A., D.SC., D.C.L., F.L.S.
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1920—21	Lt. Col. Sir David Prain, C.M.G., C.I.E., F.R.S.
1921—23	F. G. Penrose, M.D., F.R.C.P., F.Z.S., M.B.O.U.
1923—24	Sir F. W. Keeble, K.B.E., D.SC., F.R.S.
1924—26	Hubert Painter, B.SC., F.C.S.
1926—28	Heywood Sumner, F.S.A.
1928—29	Claude Lyon
1929—30	Professor F. O. Bower, D.SC., F.R.S.
1930—31	Henry Bury, M.A., F.L.S., F.G.S.
1931—32	Dukinfield H. Scott, M.A., LL.D., F.R.S., F.L.S., F.G.S.
1932—33	J. P. Williams-Freeman, M.D.
1933—34	Rev. F. C. R. Jourdain, M.A., F.Z.S., M.B.O.U.
1934—35	Sir F. W. Dyson, K.B.E., M.A., D.SC., LL.D., F.R.S., F.R.A.S.
1935—36	Henry Bury, M.A., F.L.S., F.G.S.
1936—37	Sir Harold Carpenter, M.A., D.SC., F.R.S.
1937—38	Professor John Cameron, M.D., D.SC., F.R.S.E.
1938—39	Professor G. D. Hale Carpenter, M.B.E., D.M., F.L.S., F.Z.S., F.R.E.S.
1939—40	W. G. Aitchison Robertson, M.D., D.SC., F.R.C.P., F.R.S.E.
1940—41	Rev. Professor M. C. Potter, M.A., D.SC., F.L.S.
1941—42	Inst.-Capt. M. A. Ainslie, R.N., M.A., F.R.A.S.
1942—43	William C. Simmons, B.SC., A.R.C.S., F.G.S.
1943—44	Professor S. Mangham, M.A.
1944—45	A. S. Hemmy, B.A., M.SC.
1945—46	J. F. N. Green, B.A., F.G.S.
1946—47	Lt.-Col. G. C. Drew, D.S.O., F.S.A.
1947—48	W. J. Woodhouse, A.C.P.
1948—49	Edward Hindle, M.A., D.SC., F.R.S., F.Z.S.
1949—50	Mrs. W. Boyd Watt, F.Z.S., M.B.O.U.
1950—51	Professor Sir R. A. Peters, M.C., M.A., M.D., F.R.S.
1951—52	Ernest Chambers, F.L.S.
1952—53	F. Williamson, F.R.HIST.S.
1953—54	H. E. Clarke, M.A., B.SC., F.R.I.C.
1954—55	W. J. Read, M.SC., F.R.I.C.
1955—56	W. S. Brown, B.SC.
1956—57	A. W. Legat, M.INST., C.E., M.I.S.E.
1957—58	D. A. Wray, M.SC., PH.D., F.G.S.
1958—59	Miss M. A. M. Penrose, B.SC.
1959—60	Miss D. M. Lowther, B.SC.
1960—61	James Fisher, M.A., F.L.S., F.Z.S.
1961—62	W. P. Winter, B.SC.
1962—63	F. H. Perring, M.A., PH.D.
1963—64	Miss F. M. Exton, B.A.
1964—65	Dame Kathleen Lonsdale, D.B.E., D.SC., F.R.S.
1965—66	A. J. Butcher, F.R.I.B.A.
1966—67	Mrs. A. K. Hunt, B.SC.
1967—68	Professor F. Hodson, PH.D., B.SC., F.G.S.
1968—69	T. Marshall Bell, B.A., M.B., B.CH.

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1967-68

VOLUME LVIII

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Introductory Note

The objects of the Society are declared in the second of its rules to be "the promotion of the study of Science in all its branches, and of Public Education, by means of Lectures, Field Meetings, the reading and discussion of Papers, and in any way that the Council of the Society shall deem advisable".

The branches of Science at present represented are as follows:—**Archaeology and History, Astronomy, Botany, Geography, Geology, Photography, Physics and Chemistry, Zoology—Birds, Insects, Mammals.**

During the Winter Session, from October to April, lectures on matters of scientific interest are held on two or three days a week. These are usually illustrated by slides, films, episcopes pictures, specimens, diagrams, experiments, etc.

Throughout the Summer Session, from April to September, Excursions or Field Meetings are arranged on two or three days every week, when parties of members visit places of scientific interest under the guidance of section chairmen and other specialists, sometimes in or near Bournemouth, at other times farther afield by coach or train.

The Society possesses a Library from which books may be borrowed by members, and there is a Reading Room where works of reference may be consulted. The Museum contains many valuable scientific collections and specimens. The Library and the Museum serve to illustrate and illuminate the ten Sections of the Society. There is a well-equipped Dark Room for the use of members interested in photography. The house stands in a pleasant garden of over an acre.

The management of the Society is vested in a Council, which is elected at the Annual General Meeting. Members are elected by the Council. An Entrance Fee of 5/- is payable upon nomination for election. The Annual Subscription for Town Members is £2 (Life Membership: £15): for Associate Members, aged 12-18 years, it is 10/-. The Family Subscription (for members of a family living in the same house) is as follows:—first adult member, £2; second adult member, 30/-; each additional adult member, 20/-; children between 12 and 18 years (Associate Members), 5/- each. Applicants for Associate Membership pay no entrance fee. **Town Membership is confined to those who are resident within the Municipal, Urban District and Parish Boundaries listed below:—**

HAMPSHIRE: Bournemouth County Borough, Hurn, Sopley, Christchurch Municipal Borough, Christchurch East.

DORSET: Poole Municipal Borough, Wimborne Urban District, Hampreston, West Moors, West Parley.

Members, other than Associate Members, living outside the areas listed above shall pay half the above rates of subscription. (Life Membership £15.) Special subscription for visitors to Bournemouth, 5/- per month.

Every three months a Programme giving full details of all meetings is posted to every member. A Volume of Proceedings is published annually; adult members receive a copy.

Application Forms for Membership and further particulars may be obtained from the Honorary Deputy Secretary, Mrs. B. E. Hooton-Smith, B.N.S.S., 39 Christchurch Road.

Bournemouth Natural Science Society

OFFICERS AND COUNCIL FOR 1968-69

N.B.—University degrees and other qualifications are inserted only at the first mention of names.

President:

T. MARSHALL BELL, B.A., M.B., B.CH.

Vice-Presidents:

A. J. BUTCHER, F.R.I.B.A.

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H. V. HARRIS

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MISS D. M. LOWTHER, B.SC.

MISS M. A. M. PENROSE, B.SC.

D. A. WRAY, PH.D., M.SC., F.G.S.

Chairman of Council: BRIG. A. B. D. EDWARDS, C.B.E., M.C.

Deputy Chairman: S. C. S. BROWN, F.D.S., R.C.S. (ENG.), F.R.E.

Council:

THE VICE-PRESIDENTS, OFFICERS, CHAIRMEN OF SECTIONS AND CHAIRMEN OF COMMITTEES (*all ex-officio*)

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W. E. PAGE, M.A.

W. F. PERRY, B.SC.

MRS. M. P. YULE

Chairmen of Sections:

Archaeology and History: MRS. C. SIMPSON

Astronomy: C. M. PITHER, F.R.A.S., F.I.L.S.

Botany: MRS. A. K. HUNT, B.SC. (*Chairman*)

Geography:

Geology: D. A. WRAY, M.SC., F.G.S.

Photography: MISS U. M. OGLE

Physics and Chemistry: MRS. I. M. BIRCUMSHAW, B.SC.

Zoology—Birds: MRS. L. M. MADDOX

Insects: SQUADRON LEADER J. L. C. BANKS

Mammals: MISS K. M. BENNETTS

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Hon. Assistant Treasurer: MISS G. M. GREEN, B.A., LÈS L.

Hon. Secretary: F. C. FILDES

Hon. Assistant Secretary: MRS. B. E. HOOTON-SMITH

Hon. Assistant Secretary (Programmes): A. CHARTER

Hon. Assistant Secretary (Dispatch): MISS M. HIPPERSON

Hon. Librarian: H. S. HOLBROOK, B.SC., C.ENG., F.I.E.E.

Hon. Curator: MRS. N. SEPHTON, M.B., CH.B.

Hon. Editor: D. T. ADAMS, M.A.

Hon. Slides Custodian: J. C. MITTON

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Finance and General Purposes:

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Chairman: M. H. COCKE

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Museum:

Chairman: MRS. N. SEPHTON

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Garden:

Chairman: MRS. W. CHOME

MRS. A. K. HUNT, MISS E. M. WHITAKER

House:

Chairman: A. J. BUTCHER

F. C. FILDES, MRS. B. TAYLOR, MRS. D. E. WITHERS

Tea:

Chairman: MISS E. M. WHITAKER

MISS I. K. BURROUGHS, MRS. J. S. G. KENWORTHY, MRS. W. H. LEE,
MISS F. ROWE, MISS W. A. SAUNDERS, MRS. B. TAYLOR, MISS J. WHITE

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Chairman: MISS M. ALLEN

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F. W. MOSS

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Chairman: BRIG. A. B. D. EDWARDS

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Bournemouth Natural Science Society

List of Members

Revised to 20th January, 1969

*HONORARY MEMBER
vVICE-PRESIDENT
†PAST PRESIDENT

WGILBERT WHITE FELLOWSHIP
LLIFE MEMBER
AASSOCIATE MEMBER

The year of election is given before the name of each member

1961	Adams, D. T., M.A.	13 Sandy Mead Road, Queen's Park
1961	Adams, Mrs. M.	
1968	Adkins, Mrs. K. J.	6 Pennington House, 8 Grosvenor Road
1958	Agar, R., A.M.I.C.E.	84 Howard Road
1961	Aiers, Miss E. M.	48d West Cliff Road
1958	Aiers, Mrs. F.	6 Arnewood Court, West Cliff Road
1962	Allen, Mrs. A. W. S.	80 Bath Hill Court
1963	Allen, Miss M.	174 Holdenhurst Road
1968	Allington, A. H.	29 Colemere Gardens, Highcliffe
1968	Allington, Mrs. I.	
1960	Alsford, C.	Long Field, Church Road, Ferndown
1960	Alsford, Mrs. J. R.	
1955	Ambler, Mrs. A.	3 Little Forest Road, Talbot Woods
1968	Ames, W. J. C.	3 Rothesay Road
1968	Ames, Mrs. D. A.	
1965	Andrews, Miss K. E.	14 Frances Road
1963	Archer, Mrs. H. M.	4 Barclay Mansions, St. Valerie Road
1967	Arnold, Mrs. M.	1198 Christchurch Road, Boscombe
1950	*Bailey, Mrs. A. A.	4 East Avenue
1955	Bailey, Miss F. E. L.	57 St. Catherine's Road, Southbourne
1955	Bailey, Miss G. L.	
1964	Balch, Miss M. M., M.B.E., B.A.	Flat 3, 37 Queen's Park South Drive
1962	Balfour-Browne, Miss E. F.	Acorn Cottage, Station Road, Verwood
1957	Baly, Miss O. M.	70 Brackendale Road
1966	Band, J., M.P.S.	5 Boscombe Cliff Road
1966	Band, Mrs. M., M.A.	"
1966	aBand, Miss E. M.	"
1967	Banks, Sqd.-Ldr. J. L. C.	Kingston, Dene Walk, Ferndown
1967	Barnes, F. W.	10 Manor Road, Christchurch
1967	Barnett, Mrs. C. N.	2 "Anstey Cove", 3 Dover Road, Branksome Park
1965	Bates, A. D.	8 Southlea Avenue, Southbourne
1964	Bates, Mrs. G. E.	29 Lascelles Road
1968	Beach, A. W.	C2, Halebrose Mansions, Belle Vue Road, Southbourne
1968	Beach, Mrs. D.	
1968	Beer, Miss J. L.	2 Dale House, Wharfdale Road
1944	Bell, T. M., B.A., M.B., B.CH.	5a Stourwood Avenue, Southbourne
1941	Bell, Mrs. R. M.	
1963	Bennetts, Miss K. M.	Flat 29, "Belle Vue" Gardens, Belle Vue Road, Southbourne
1947	Berrill, Miss M. E.	41a Cavendish Road
1967	Bettell, Miss I. M.	4 Curzon Court, Portarlinton Road
1966	Bidder, E. R.	Bourne Hall Hotel, Westbourne
1968	Birchenough, J.	23 Chine Walk, Ferndown
1965	Bircumshaw, Mrs. I. M., B.S.C.	Flat 116, Albany, Manor Road
1968	Bisiker, T. D.	23 Greensleeves Avenue, Broadstone, Dorset

- 1946 Blackmore, H. C., L.D.S., R.C.S. 17 Ferry Road, Southbourne
 1946 Blackmore, Mrs. E. E. "Cleve Court Hotel, Knyveton Road
 1968 Blick, L. W., C.ENG., M.I.E.E. 105 Ringwood Road, Verwood
 1964 Blower, Miss M. 17 Browning Avenue, Boscombe Manor
 1960 Boite, E. E. G. 41 Cedar Avenue, Christchurch
 1966 Booth, Miss J. M. Lyndale "Private Hotel", Hengistbury Road,
 1957 Booth, Mrs. L. Southbourne
 1966 Boston, Miss S. S. Central Library, Lansdowne
 1968 Bournemouth Public Libraries (H. E. Radford, F.L.A.)
 2 Wootton Court, Wootton Mount
 1967 Bowers, Mrs. M. P. 16 Knole Road
 1956 Brain, Miss C. M. 4 Cedar Avenue
 1968 Brazier, Miss M. A. Amberley Court, Bath Road
 1968 Broomhall, M., D.LIT., F.I.L., F.R.G.S. 3 Blake Hill Avenue, Parkstone
 1967 Brown, H. G. 11 St. Winifred's Court, 3 St. Winifred's
 1966 Brown, Miss R. W., B.A. Road
 158 Harewood Avenue, Queen's Park
 1967 Brown, S. C. S., F.D.S., R.C.S., F.R.E. 4 St. Winifred's Road
 1962 Brown, Miss V. C. Nazareth House, London Road, Charlton
 1951 wBull, A. W. M., C.B. Kings, Glos.
 14 Richmond Park Avenue
 1964 Burroughs, Miss I. K. Cottonwood Hotel, Grove Road
 1966 Burrows, Miss E. 4 Berne Court, Grove Road
 1930 Bury, Miss G. J. Flat 4, 77 Haven Road, Canford Cliffs
 1946 Busby, Miss A. G. "Hilton", Dudsbury Avenue, Ferndown
 1952*†vButcher, A. J., F.R.I.B.A. Old Park Farm, Lytchett Matravers
 1957 Butler, G. W. " " "
 1957 Butler, Mrs. " " "
 1967 Cady, Mrs. L. 108 Alexandra Road, Parkstone
 1928 L Calkin, J. B., M.A., F.S.A. Virginia House, Langton Matravers
 1967 Cannon, Miss J. 63 Edmondsham House, Terrace Road
 1967 Carsbury, W. H., C.ENG., M.I.E.E. West Drive, Ballards Close, Lytchett
 Matravers
 1967 Carsbury, Mrs. M. 31 Wistaria "House, "Redhill Drive
 1964 Cartwright, Miss D. E., M.B.E. 5 Headswell Crescent
 1967 Chalmers, Mrs. E. W., M.A. Sandykeld, Manor Road
 1943*†vChambers, E., F.L.S. Flat 3, 1 "Cavendish Place
 1950 Chambers, Mrs. E. 22 Grand "Avenue, Southbourne
 1959 Charter, A. 262 Windham Road
 1959 Charter, Mrs. E. E. 6 Alyth Road
 1945 Child, Miss L. M. The White "House, Colebrook Street,
 1912 L*Chilver, Miss K. M. Winchester
 1951 Chomé, E. E. P. 18 Pickford Road
 1942 Chomé, Mrs. W. 12 Alum Chine Road
 1950 Churches, Mrs. E. W., M.B., C.H.B. 71 Southbourne Road
 1968 Clamp, Miss D. 4 Gardens Court, Parkstone Road, Poole
 1962 Clark, Mrs. F. M. The Manor House, Fovant, Wilts
 1958 Clarke, Miss A. M., B.A. 3 Tutton Lodge, Stanpit, Christchurch
 1945 Clarke, Mrs. M. 11 Oakley Road, Wimborne
 1927 *Clay, R. C., M.D., F.S.A. 21 Woodside Road, Ferndown
 1967 Clifton, Mrs. F. A., D.P.H. 18a Penn "Hill Avenue, Parkstone
 1963 Clode, J. C. 92 Surrey Road, Branksome, Poole
 1966 Coates, J. E. " " "
 1966 Coates, Mrs. D. M. 1 Ken Road, Southbourne
 1958 Cocke, M. H. " " "
 1968 Collins, F. G. " " "
 1968 Collins, Mrs. I. M. A. " " "
 1967 Connell, J. R., A.I.B. " " "

- 1941 LCooper, Mrs. E. M.
 1951 LCooper, Miss R. I.
 1945 Cooper-Hunt, Mrs. E. G.
 1965 Cornell, Mrs. N. J.
 1952 Corser, Miss G. M.

 1967 Coward, Miss M. B.
 1948 Cox, Mrs. E. D.
 1956 Cox, Miss M. G. E.
 1962 Cragg, Miss M. A.
 1962 Critchley, Mrs. M. M.
 1966 Cromey-Hawke, Mrs. D.
 1959 Cutland, W.

 1959 Cutland, Mrs. H. M.

 1960 Dalrymple-Watt, Lady G. V.
 1968 Davis, Miss D. W.
 1964 Day, Mrs. A.
 1967 Deacon, Miss M. G. K.
 1966 ADecalmer, P. B. S.
 1930 *de Castro, H.
 1968 Deptford, Mrs. C.
 1935 Derry, Mrs. H. E.
 1962 Dickson, A. A.
 1961 Dixon, Sir Arthur, C.B., C.B.E.,
 B.A.
 1949 Dixon, Miss H. C.

 1958 Domney, Miss M.
 1960 Dool, Mrs. N. M.
 1968 Dowland, Mrs. M. M.
 1961 Draper, Mrs. G.
 1953 Dudley, D. J.
 1955 Dudley, Mrs. I.

 1967 Earl, Mrs. J. C.
 1953 Eaton, Mrs. V. W.
 1956 Edmonds, Miss K. E.
 1965 Edwards, Brig. A. B. D.,
 C.B.E., M.C.
 1967 Eisner-Heublum, Mrs. A.,
 P.H.D.
 1963 Elliott, Mrs. D.
 1968 Ensor, Mrs. B. L.
 1967 Evans, Lt.-Col. H. G.
 1967 Evans, Mrs. E. M.
 1955*†vExton, Miss F. M., B.A.
 1960 Exton, Miss J. M.

 1959 Falvury, P.
 1953 LFarwell, Mrs. S. M. A.
 1963 Field, A. J., M.C., B.SC., F.I.M.
 1963 Field, Mrs. E., B.SC.
 1965 Fildes, F. C.
 1965 Fildes, Mrs. E. M.
 1951 †wFisher, J., M.A., F.L.S., F.Z.S.
 1966 Fitch, Miss E. N.
 1965 Foley, Miss E.
 1954 Follett, Mrs. V.
 1962 Foote, H. N., D.OPT.
 1966 Foster, Mrs. A.
 1963 Fox, Mrs. V.

 125 Queen's Park Avenue

 40 Marine Drive East, Barton-on-Sea
 1 Overcliffe Mansions, Manor Road
 3 Aspen House, Elm Grove Place,
 Salisbury, Wilts.
 31 Belle Vue Crescent, Southbourne
 248 Castle Lane
 7 Chessington Ct., Durley Chine Road
 Bourne Hall Hotel, Westbourne
 2a New Street, Ringwood, Hants.
 38 Elgin Road, Talbot Woods
 Flat 11, Guy's Close, Addison Square,
 Ringwood, Hants.
 " "
 1 Berwick Road, Talbot Woods
 49 Norton Road, Winton
 15 Bosley Way, Christchurch
 42 Belmont Road, Parkstone
 21b Meyrick Park Crescent
 72 Springdale Avenue, Broadstone
 22b Wharfdale Road, Parkstone
 33 Belle Vue Crescent, Southbourne
 "Muskerry", 23 Sandy Lane, Upton
 Bourne Hall Hotel, Westbourne

 Meyrick Grange Hotel, 50 Christchurch
 Road
 Flat 2, 77 Haven Road, Canford Cliffs
 55 East Howe Lane
 49a St. Catherine's Road, Southbourne
 68 St. Alban's Avenue
 17 Widdicombe Avenue, Parkstone
 " "
 158 York Road, Broadstone
 12a Alum Chine Road, Westbourne
 74 Namu Road, Winton
 234 Burlington Hotel, Boscombe

 5 Pandora Road, N.W.6

 85 South Road, Boscombe
 31 Brudenell Avenue, Canford Cliffs
 10a Winnards Close, West Parley

 Far Hills, "Bestwall Crescent, Wareham

 Alpine, Warren Road, Westbourne
 Latch Farm, Fairmile, Christchurch
 85 Lower Blandford Road, Broadstone
 " "
 32 Clifton Road, Parkstone
 " "
 The Old Rectory, Ashton, Northampton
 c/o Lloyd's Bank, 106 Poole Road
 27 The Chantry, Madeira Road
 Windward, Stevenson Crescent, Parkstone
 Park Walk, Shaftesbury, Dorset
 33 Tollard Court, West Hill Road
 1 Clifton Court, Heathcote Road,
 Boscombe

- 1963 Freeman, Miss R. C. 10 St. Augustin's Road
 1968 French, A. H. 36 Dulsie Road, Talbot Woods
- 1960 Gahan, Mrs. M. 215 Holdenhurst Road
 1957 Galbraith, Mrs. A. 5 Lynwood Court, Drysgot Road, Radyn,
 nr. Cardiff
- 1968 Gallant, Miss E. D. 245 Burlington Hotel, Boscombe
 1956 Gandy, Mrs. L. 11 Cranleigh Gardens, Southbourne
 1951 Goddard, Miss E. F. 215 Holdenhurst Road
 1963 Goldie, Mrs. C. D. M. 20 Balcombe Road, Branksome Park
 1959 Gompel, M. E., B.SC. 12 Chigwell Road
 1937 Gompel, Mrs. M. K.
 1960 Good, Prof. R., M.A., SC.D. 8 Durlston Road, Parkstone
 1960 Good, Mrs. P. G.
 1949 Goodhart, Mrs. M. S. West Thorpe, Lymington
 1956 Goodman, Miss J. R. 4 Pinewood Road, Branksome Park
 1963 Graham, Miss C. 16 Church Road, Southbourne
 1965 Grange-Bennett, Mrs. M. 6 Brudenell Avenue, Canford Cliffs, Poole
 1953 Gray, Miss E. 44 Edmondsham House, Terrace Road
 1967 Green, Mrs. E. I., B.A. 11 Dingle Road, Southbourne
 1956 Green, Miss G. M., B.A., LèSL. 17 Clifton Road, Parkstone
 1967 Griffiths, H. D. C23, San Remo Towers, Boscombe
- 1961 Haines, Miss E. S. "Little Orchard", Godshill, Fordingbridge,
 Hants
 1951 Haines, Miss G. M. Appleslade, Linwood, Ringwood
 1951 Haines, Miss R. M.
 1962 Hall, Mrs. E., B.SC. 16 Beresford Road, West Southbourne
 1968 Hall, Mrs. M. Coley Mead, Lyndhurst, Hants
 1959 Hards, Mrs. D. K. 30 Dean Park Road
 1960 Hardy, Miss L. H. 20 The Grove, Redhill Park
 1955 *vHarris, H. V. 15 St. Winifred's Court, St. Winifred's Rd.
 1958 Harris, Mrs. W. I.
 1961 Harvey, Mrs. F. E., M.B., C21, San Remo Towers, Boscombe
 CH.B.
- 1959 Harvey, Miss G. E. J. 37 Redhill Court, Wimborne Road, Moor-
 down
- 1964 Hatton, R. H. S., M.A. The Small House, Llangennith, Glam.
 1951 Hawker, Mrs. E. 64 Alumhurst Road
 1951 Hayman, Miss M. S. 39 Queen's Park South Drive
 1956 Heath, Mrs. C. J. The Chantry, Keswick Road
 1954 Hermon, J. A. 43 Stourcliffe Avenue, Southbourne
 1967 Hill, Mrs. L. M. 23 St. Leonard's Road
 1968 Hills, Mrs. W. 271 Burlington Hotel, Boscombe
 1962 Hipperson, Miss M. 69 Headswell Avenue
 1962 †vHodson, Prof. F., PH.D., F.G.S. Geology Dept., University of Southampton
 1960 Holbrook, H. S., B.SC., C.ENG., 5 Staunton House, Exeter Park Road
 F.I.E.E.
- 1963 Holbrook, Mrs. M. E.
 1962 Holmes, Mrs. N. E. F.
 1952 *Holroyd, G.
 1966 Holt, Miss C.
 1961 Hooton-Smith, E. W.
 1961 Hooton-Smith, Mrs. B. E.
 1967 Hopkins, Miss C. M.
 1967 LHorne, Miss E., M.A.
 1968 Hughes, D. H.
 1968 Hulme, Miss D.
 1957 Hunt, W. H.
 1954*†vHunt, Mrs. A. K., B.SC.
- 7 St. John's Road, Boscombe
 4 Beechey Road
 83 Stanpit, Christchurch
 36 Wellington Road
- St. Hugh's College, Oxford
 4 Rowena Road, Southbourne
 278 Burlington Hotel, Boscombe
 D11, Pine Grange, Bath Road
 Flat 1 5 Alton Road, Parkstone
- 2 Redcotts, Wimborne, Dorset

- 1968 James, Mrs. D. M.
 1933 James, Mrs. M. G.
 1960 James, W. H.
 1945 Jenkins, Miss P.
 1962 Jones, Miss O. E. C., S.R.N.
 1968 Joseph, Miss E. O.

 1928 Kendall, Miss G. J., A.R.C.M.
 1968 Kent, F., M.R.C.S., L.R.C.P.
 1963 Kenworthy, Mrs. J. S. G.
 1968 Kernot, Miss F. L.
 1967 Kneller, Mrs. H. E.
 1965 Kilby, Miss M.
 1965 Killick, Mrs. K. D.
 1968 King, G. M.
 1967 King, Mrs. M. V. B.

 1968 Labergé, Mrs. W. A. B.A.
 1968 Laidlaw, W.
 1968 Laidlaw, Mrs. M.
 1965 Lambert, Mrs. V. L.
 1967 Lansley, F. S., B.SC.
 1967 Lansley, Mrs. G. E., S.R.N.
 1959 Lawes, A. V.
 1962 Leake, Mrs. I. B.
 1966 Leck, Miss W. A.
 1966 Lee, W. H.
 1967 Lee, Mrs. L. B.
 1966 Legge, Mrs. I.
 1948 Leonard, Mrs. N.
 1957 Le Roy, Miss E. S. H.
 1957 Le Roy, Miss M. C. G.
 1958 Le Sueur, Mrs. D. G.
 1965 Lever, Mrs. M. E.
 1961 Lewis, Miss D. M.
 1966 Lewis, Miss S.
 1951 Lloyd, G. B., B.A.
 1950 Locke, Mrs. J. B. E., B.A.
 1947 Logan, Miss A.
 1951 wLowe, Mrs. D. M.
 1934*†vLowther, Miss D. M., B.SC.

 1956 McClay, H.
 1965 MacDonald, Miss C. M.
 1963 MacKeith, Miss M. R., B.SC.
 1956 Maddox, Mrs. L. M.
 1959 Mariette, Miss G. A.
 1946 Marshall, Miss D. H.
 1954 Marshallsay, Miss E. N.
 1967 Martin, F. B., F.C.I.I.
 1968 Martin, Mrs. P.
 1964 L.Masters, Miss K. F.
 1958 Mate, Mrs. F. M.
 1968 Mearns, N. A.
 1956 Middlemast, A. H.
 1956 Middlemast, Mrs. M.
 1964 Middleton, W. J.
 1965 Miles, L. L. H.
 1956 Mills, Miss N.
 1959 Mitton, J. C.
 1965 Morgan, A. E.
 1959 Morgan, Commander S. T.,
 O.B.E., R.N. (Retd.)
 1959 Morgan, Mrs. V.

 12 Owls Road, Boscombe
 70 St. Alban's Avenue
 19 Donnelly Road, Southbourne
 Galltfaenan, Trefnant, Denbigh
 86 Hoburne Farm Park, Christchurch
 10 Durley Chine Road

 62 Churchfield Road, Poole
 9 Geneva Avenue, Southbourne
 8 Ripon Road, Winton
 5 Queen's Park Road
 8a King's Avenue, Parkstone
 15 Southlands Avenue, Corfe Mullen
 4 Highlands Road, Barton-on-Sea
 E44, San Remo Towers, Boscombe
 66 Albany, Manor Road

 10 Radcliffe Court, Manor Road
 14a Newstead Road, Southbourne

 School House, School Lane, Ringwood
 33 William Road, Queen's Park

 48 Seaford Road, Southbourne
 21 Langside Avenue, Parkstone
 5 Heathwood Road
 18 Ravenshall, West Cliff Road

 E13, San Remo Towers, Boscombe
 1 Neville Court, Derby Road
 Forest Mead, Tyrrell's Ride, Burley, Hants

 49 Wellington Road
 54 Hoburne Farm Park, Christchurch
 137 Burlington Hotel, Boscombe
 31 Greenways, Highcliffe-on-Sea
 58 Glenferness Avenue
 St. Gabriel's, St. Clement's Gardens
 3 Grosvenor Court, Vale Road
 43 Marryat Road, Wimbledon, S.W.19
 Lonsdale, 15 Mayfield Avenue, Parkstone

 64 Blake Dene Road, Lilliput
 15 Dingle Road, Southbourne
 13 Addis Square, Southampton
 31 Egerton Road, Queen's Park
 4 Mansfield Avenue, Parkstone
 76 Palace View, Bromley, Kent
 4 Berkeley Road
 C25, San Remo Towers, Boscombe
 45 The Avenue, Moordown
 10 West Way Close, West Way
 8 Clifton Road, Parkstone, Poole
 17 Mayfield Avenue, Parkstone
 86 Hengistbury Road, Southbourne

 34 Compton Avenue, Parkstone
 D41, San Remo Towers, Boscombe
 8 Herbert Road
 3 Gainsborough Road
 c/o 1 Overcliffe Mansions, Manor Road
 Bracken Cottage, Blissford,
 Fordingbridge, Hants.

- 1963 Moss, F. W.
 1963 Moss, Mrs. D. M.
 1962 Mott, Miss J. H.
 1966 Munns, Miss N. W., B.SC.
 1965 Murch, Mrs. O. E.
- 1960 Nelson, A., F.C.A.
 1963 Newton, Mrs. K. F.
- 1967 Nicklen, Mrs. L. V.
 1968 Noll, Miss C. F.
- 1957 Odell, Mrs. G. B.
 1964 Odom, Miss E. V., M.A.
 1929 Ogden, Miss E.
 1948 Ogden, F.
 1950 Ogle, Miss U. M.
 1965 Oliver, Miss D. K.
- 1968 Padwick, H. N.
 1968 Padwick, Mrs. M. D.
 1958 Page, W. E., M.A.
 1967 Parmenter, L., F.R.E.S.
 1968 Parsons, Miss M. W.
 1963 Payne, Miss H. I.
 1916 *L Penrose, Miss F.
 1916 *LV† Penrose, Miss M., B.SC.
 1948 Perceval, Mrs. W.
 1963 Perry, W. F., B.SC.
 1961 Pesterfield, Miss M.
 1950 †Peters, Sir R. A., M.C., M.A.,
 M.D., F.R.S.
- 1953 Pickering, V. T.
 1953 Pickering, Mrs. C. G.
 1959 Pierce, Mrs. E. K.
 1959 Piper, P. J., F.R.I.C.S.
 1966 Pither, C. M., F.R.A.S., F.I.L.S.
 1966 Poole, Mrs. I.
 1955 Porter, Miss D. A.
 1965 Preston, Mrs. T. A.
 1967 Prideaux, Miss C.
 1964 Prince, Miss E. M., S.R.N.
 1968 Pugh, Mrs. E. M.
 1967 Purdy, Mrs. K. M.
- 1951 LRead, Mrs. H. A.
 1957 Reakes, Rev. G. S., B.A.
- 1957 Reakes, Mrs. K. A.
 1967 Richardson, Miss A. K.
 1966 Robbins, Miss R., M.SC.
 1949 Robertson, Mrs. M.
 1964 Rose, Mrs. D., M.A.
 1967 Rosemond, S. J., F.I.L.
 1963 Rossiter, Mrs. D., M.
 1959 Rowe, Miss F.
 1963 Rushton, Miss K. M., M.SC.,
 M.B., CH.B.
 1967 Rushton, W.
 1967 Russell-Cotes Art Gallery
 1965 Ryde, K. A.
 1965 Ryde, Mrs. M. K.
- 39 Hengistbury Road, Southbourne
- 2 Warren Avenue, Mudeford, Hants
 28 Crescent Court, Chine Crescent
 4 Highlands Road, Barton-on-Sea
- 65 Alyth Road, Talbot Woods
 Rose Hill Hotel, MacAndrew Road,
 Canford Cliffs
 77 Holdenhurst Avenue
 2 Pinecliff Avenue, Southbourne
- Cottonwood Hotel, East Cliff
 18 Church Road, Southbourne
 1 Rossini Cottage, Hedgemead, Bath
 Cottonwood Hotel, East Overcliff Drive
 2 Frankland Crescent, Parkstone
 35 Boscombe Spa Road
- 12 Arlington House, Clarendon Road
- 53 Petersfield Road, Boscombe East
 Woodside, Pinewood Road, Ferndown
 40 Ashton Road, Moordown
 83 St. Luke's Road
 Little Picket, Hightown, Ringwood
- 7 Benellen Avenue
 117 Portland Road
 56 Gresham Road
 3 Newnham Walk, Cambridge
- Francesca, Hightown, Ringwood, Hants
- 4 Mansfield Avenue, Parkstone
 18 Mayfair, West Cliff Road
 86 Canberra Road, Christchurch
 23 Spur Hill Avenue, Parkstone
 23 Christchurch Road
 11 Nairn Court, 12 Nairn Road
 28 Ravine Road, Canford Cliffs
 4 St. James Sq., New Mills, Nr. Stockport
 1 Woodside Close, Ferndown
 158 York Road, Broadstone
- 15 Carbery Avenue, Southbourne
 The Cottage, 7 The Avenue, Branksome
 Park
- 31 Pinewood Road, Branksome Park
 52 Burton Court, Chelsea, S.W.3
 41 Christchurch Road
 5 East Avenue, Talbot Woods
 64 Colman Court, Manor Road
 5 Park Homer Road, Colehill, Wimborne
 23 Stourcliffe Avenue, Southbourne
 20 Greenways, Highcliffe
- East Cliff
 95 Barton Court Avenue, Barton-on-Sea
- " "
 " "

- 1951 wSalisbury, Sir E., D.S.C., F.R.S.,
F.L.S. Croindene, Strandway, Felpham, Bognor
Regis, Sussex
- 1954 Saunders, Miss W. A. 11 Portman Crescent, Boscombe
- 1967 Screeton, Miss G. M. B6, Exbourne Manor, 37 Christchurch
Road
- 1938 Seare, Mrs. S. F. E. Almer, Blandford
- 1960 Sephton, Mrs. N., M.B., CH.B. Flat 1, 4 Talbot Avenue
- 1951 Sewell, Mrs. I. 4 Maundeville Crescent, Christchurch
- 1941 Sexton, Miss F. 60 Uplands Road
- 1966 Shelton, Miss V. A. 112 Lowther Road
- 1968 Shewell, Capt. A. V. E46, San Remo Towers, Boscombe
- 1937 Simmons, Mrs. I. M. 73 Spur Hill Avenue, Parkstone, Poole
- 1963 Simpson, Mrs. C. Flat 46, Sunningdale, 28 Braidley Road
- 1966 Simpson, Mrs. D. 15 Gadbridge Court, West Cliff Road
- 1920 Simpson, N. D., M.A., F.L.S. 3 Cavendish Road
F.R.M.S.
- 1961 Sims, Mrs. M. M. E. 22 Dunclyff Road, Southbourne
- 1959 Sliker, Miss H. R. M. 133 Seafeld Road, Southbourne
- 1963 Smith, D. V. H., C.ENG.,
M.I.MECH.E., M.I.H.V.E. 17 Little Forest Road, Talbot Woods
- 1965 Smith, Miss G. M. c/o Lloyds Bank, 45 Ealing Broadway,
W.5
- 1959 Soar, Miss I. M. 11 Grosvenor Road
- 1962 Sparks, Miss A. 12 Joanna Close, Downton, Salisbury
- 1962 Sparks, Miss M.
- 1967 Spencer, S. R. Foxholes, "Golf Links" Road, Ferndown
- 1965 Staples, E. G., M.A. 7 Easter Court, 31 St. John's Road,
Boscombe
- 1962 Stiff, Miss F. A. 19 Heathwood Road, Winton
- 1962 Still, D. C., F.S.M.C., D.OPT. 56 Highfield Road, Moordown
- 1968 Stimpson, Mrs. A. S. 19 Coy Pond Road, Branksome, Poole
- 1966 Storr, Mrs. W. W. 4 Moonraker's Way, Highcliffe, Hants
- 1967 Strain, W. S., M.A. 65 Farm Lane North, Barton-on-Sea
- 1967 Strain, Miss A. W.
- 1956 Stray, J. F. Browngates, Barton Lane, Barton-on-Sea
- 1957 Stray, Mrs. S. V. M.
- 1960 Sunderland, Mrs. R. B. 18 Spur Hill Avenue, Parkstone
- 1967 Swann, Miss R. F. S. 9 Coy Pond Road, Branksome
- 1950 Sworder, Miss R. c/o Barclay's Bank Ltd., 659 Christchurch
Road, Boscombe
- 1962 Tarrant-Willis, F. E. 52 St. Osmund's Road, Parkstone
- 1955 Taylor, Mrs. B. 164 Belle Vue Road, Southbourne
- 1967 Teasdill, G., F.M.A., F.R.S.A.,
F.R.N.S., F.Z.S. 99 Carbery Avenue, Southbourne
- 1967 Teasdill, Mrs. N. A.
- 1965 Thomas, W. C. Oriens, "Dilly Lane, Barton-on-Sea"
- 1965 Thomas, Mrs. G. M., M.A.,
B.LITT. " "
- 1964 Thorne, Mrs. M., B.A. 2 Chestnut Avenue, Uddens, Wimborne
- 1966 Till, N. W. L. 165 Manor Road, Verwood
- 1966 Till, Mrs. A. M. E.
- 1965 Todd, Miss E. Crichton 36 Alumhurst Road, Westbourne
- 1966 Tozer, Miss D. 10 Clarendon Road
- 1968 Turner, Mrs. C. C. 5 Netherhall Gardens, Westbourne
- 1968 Turner, D.
- 1949 *Turner, G. A. 4b Wimborne Road
- 1959 Tyler, E. F. 43 Brackendale Road
- 1968 Vaughan, Miss J. M. 29 Barrie Road, Moordown
- 1950 Venning, Brig. F. E. W., C.B.,
C.B.E., D.S.O., M.B.O.U. Pinewood, Butts Ash, Hythe

1968	Wagner, H. W.	8a Manor Road
1968	Wagner, Mrs. N. E. K.	
1968	Wagstaff, Miss V. D.	38 Westfield Road, Southbourne
1961	Waldy, Mrs. V. M.	The Paddocks, Dover Road, Branksome Park
1967	Walker, Miss G., M.B., CH.B., D.P.H., B.SC.	E16, San Remo Towers, Boscombe
1966	*Walker, H. G., LL.B.	Hordle Dene, Hordle, Lymington
1955	Walker, Mrs. L. W.	12 Fernbank, St. Stephen's Road
1961	Wallace, Miss J. B., B.SC. (ECON.)	10 St. Ives Park, Ringwood, Hants
1961	Wallis, Miss M. E.	2 Warren Avenue, Mudeford, Christchurch
1968	Watson, E. M.	57 Gresham Road
1947	West, Miss G. M.	The Knapp, Studland, Dorset
1961	Weston, Miss S. A.	48d West Cliff Road
1924	Whitaker, Miss E. M.	22 Somerset Road, Boscombe
1924	Whitaker, S. E., A.R.I.C.S.	22 Selwood Road, Addiscombe, Croydon
1962	White, Mrs. A. W.	39 Belle Vue Gardens, Belle Vue Road, Southbourne
1963	White, Miss D. L. M.	23 Pinewood Road, Branksome Park
1963	White, Miss J.	
1968	AWhite, Miss C. M.	30a Branksome Hill Road
1968	AWhite, Miss F. E.	
1967	Wilks, Miss A. E. M.	3 Shorefield Way, Milford-on-Sea
1963	Winser, Miss M. M.	3 Mount Blairy, 23 St. Winifred's Road
1956	Wise, Mrs. B.	55 Namu Road, Winton
1960	Withers, A. E., F.A.I.	E41, San Remo Towers, Boscombe
1960	Withers, Mrs. D. E.	
1948	AWood, Miss E. B., B.SC.	4 New Park Road, West Southbourne
1958	Wood, F. J.	15 Boscombe Spa Road
1956	Wood, T. E., M.A., LL.B.	21 Durley Chine Road
1967	Workers' Educational Assoc.	2 Wolverley Court, 31 Marlborough Road (Hon. Sec.)
1949	†vWray, D. A., M.SC., PH.D., F.G.S.	42 Canford Cliffs Road
1956	Wray, Miss J., S.R.N.	
1946	Wycherley, Mrs. L.	11 Hayes Avenue, Queen's Park
1965	Yorke, Mrs. N. M.	15 Dingle Road, West Southbourne
1964	Young, Miss A. M., L.L.A.	6 Salisbury Road, Boscombe
1967	Young, Mrs. G.	3 South Court, Milford-on-Sea
1958	Yule, Mrs. M. P.	89 Orchard Avenue, Parkstone

It is with deep regret that we have to announce that during the past year the following members have died (the figure in brackets is the year of joining the Society):— W. Parkinson Curtis (1903), Lt. Col. A. L. Paris (1945), W. J. Read (1945), G. A. Shillidy (1950), P. C. Gardiner (1955), Mrs. M. E. Powis (1957), Mrs. F. C. Allen (1958), J. W. T. Faulkner (1966), Mrs. V. Young (1967).

AFFILIATIONS

The Society subscribes to the following organisations:— National Trust, Botanical Society of the British Isles, Council for British Archaeology, Council for British Ornithology, Hampshire and Isle of Wight Naturalists' Trust, Dorset Naturalists' Trust, South-Eastern Area Museum Service. The Society is affiliated to The British Association for the Advancement of Science.

BOURNEMOUTH NATURAL SCIENCE SOCIETY

Summary of the Accounts for the year ended September 30th, 1968

1966/7				Receipts				1966/67				Payments					
					£	s.	d.		£	s.	d.						
705	1	0	Subs. to Sept. 30th, 1968	732	16	0		170	18	5	Caretaker, Wages, Insurance and S.E.T.	172	12	9			
93	15	8	Covenant Tax refunds ...	93	16	9		114	9	2	Insurance	114	9	2			
								319	16	0	Maintenance	201	13	10			
								254	5	1	Rates	264	13	6			
263	17	2	Royal Commonwealth Society ...	292	13	8									753	9	3
100	0	0	Camera Club ...	100	0	0		49	17	6	Coal	26	15	0			
2	5	3	Dark Room ...	15	6			143	7	10	Gas	152	15	7			
								126	16	2	Electricity	148	6	2			
21	1	8	Royal Commonwealth Society, gas refunds	23	11	2		12	15	8	Water	12	15	8			
5	10	3	Telephone call box	7	1	0		126	17	10	Printing and Stationery	167	19	2			
24	7	6	S.E.T. repayments	38	15	0		107	0	0	Proceedings	104	4	6			
6	5	0	Projection fees	5	0	0		35	13	6	Telephone	37	2	5			
22	0	0	Sundries	17	0	0		56	17	11	Postages	47	19	7			
															357	5	8
40	0	0	Field Meetings refunds	46	16	6		90	0	0	Garden	60	0	0			
37	4	0	Garden Party (net)	20	12	2		12	13	11	New Year Party	14	11	2			
6	6	9	New Year Party (net)	5	13	6									74	11	2
16	17	6	Teas (net)	11	9	9		17	15	0	Subscriptions to other Societies	13	13	0			
307	15	3	Interest on Investments	324	12	1		23	0	5	Sundry payments	21	10	6			
183	19	2	Income Tax refunds (on interest)	194	14	0									35	3	6

Receipts other than Ordinary

Legacy from the late Miss G. V. Watson ...	300	0	0
Legacy from the late Miss E. M. Richards ...	100	0	0
Transferred from Deposit Account ...	550	0	0
Legacy from the late Mr. W. P. Winter ...	10	0	0
Donations ...	1	0	0
Balance at Bank, 30.9.67	50	10	11
Cheques in hand, 30.9.67	69	11	6
Cash in hand ...	6	6	7
151 0 0	120	9	0
	£2996	16	1

Payments other than Ordinary

Purchase of £500 County Borough of Luton Mortgage $7\frac{1}{4}\%$...	500	0	0
Transferred to Deposit Account ...	850	0	0
Balance at Bank, 30.9.68	81	2	2
Cheque in hand ...	4	6	6
Cash in hand ...	5	5	5
	£2996	16	1

We have examined the above Accounts with the Books of the Society and Vouchers for payments and certify the same to be correct.

ALBERT V. LAWES }
A. H. MIDDLEMAST } Auditors

F. J. WOOD, Hon. Treasurer.

Report of Council for the Year ending 30th September, 1968

A glance at the list of the year's activities which follows this report is sufficient to show that the Society has had another very successful year — indeed it substantiates the claim made previously that this Society has something to offer anyone interested in some branch of Science. The Society's thanks are again due to the Chairmen of Sections on whom the burden of these arrangements principally falls and to all those who assist in the running of the Society.

Special appreciation must also be acknowledged to two members who have found it necessary to resign their offices, namely, Miss F. M. Exton, B.A., and Miss M. Hipperson.

Miss Exton has for many years been chairman of the Geography section, and in the last few years has had the added responsibility of being chairman of the Committee of Sections. The Council showed their appreciation of her work by awarding her Honorary Membership in addition to the Vice-Presidency which was conferred on her after her year of Presidency of the Society.

Miss Hipperson has for several years acted as Assistant Secretary with particular responsibility for membership records and the minuting of meetings of Council and Finance and General Purposes Committee—unspectacular but very necessary work, involving a great deal of time. Despite her resignation from this office, however, Miss Hipperson is continuing her good work for the Society in other ways.

The Council welcomes Mrs. A. K. Hunt, B.Sc., who has taken over the responsibility of Chairmanship of the Committee of Sections, and Mrs. Hooton-Smith who becomes Assistant Secretary.

Less satisfactory is the fact that it has been so far impossible to find anyone willing and able to take over the Chairmanship of the Geography Section, which is therefore in abeyance, and until a Chairman is found this means fewer lectures under this heading.

It is therefore again necessary to stress that our Society represents a co-operative effort, and members are urged to offer their services in any capacity they can. The Hon. Editor, Mr. D. T. Adams, M.A., is very anxious to find a successor, and additional help would also be welcome on the Secretarial side and in the Library.

Honorary Membership has also been conferred on certain other members for services to the Society over many years, and the Council is glad to report that the services of these members is being continued. These members are (1) Mrs. A. K. Hunt, B.Sc., a Past-President, a Vice-President, Chairman of the Botany Section and now also Chairman of the Committee of Sections; (2) Miss D. M. Lowther, B.Sc., a Past President and a Vice-President, who has filled a number of other offices in the Society including that of Assistant Secretary for many years, Chairman and Deputy Chairman of Council; (3) Mr. G. Holroyd whose work as Official Projectionist of the slide projector and the Episcopo and the working of sound equipment is known to most members; (4) Mr. H. G. Walker, LL.B., our Official Solicitor, who has been extremely helpful to the Society during the past two or three years, and (5) Miss E. M. Whitaker, who first joined the Society in 1924, has been an enthusiastic supporter of the Society for 44 years and does much quiet and efficient work as Chairman of the Tea Committee.

The Council with great regret accepted the resignation of our former Caretaker, Mrs. Lever, but feels that in Mrs. Scott they have found a worthy successor.

Membership this year has again shown a small fall. The reasons are those specified in last year's *Proceedings*. Each year brings a loss of members by death or resignation and many letters of resignation indicate advancing years as the reason. There is, on the other hand, a fairly steady supply of new members, but for some years now this supply has not been quite sufficient to balance the loss. The Society is still in a fairly healthy condition but an increase of suitable members would help to relieve any anxieties as to the future, particularly in the replacement of officers. The Council suggests that if each member would try to recruit one additional member the Society's position would be greatly strengthened.

The payment of subscriptions under Deed of Covenant is growing and, it is hoped, will continue to grow as the benefits to the Society are substantial and help to account for the satisfactory condition of the Society's finances. The only long term worry is the Society's house which is old and requires constant repair, although here the Council would like to pay tribute to the untiring work of the Honorary Architect, Mr. A. J. Butcher, F.R.I.B.A. The Council must, however, look ahead to the time when some rebuilding may be necessary, and a strengthening of the Society's reserves is something to be borne continually in mind.

The Council has already given some thought to a gradual revision of the Society's investments, to afford some protection against inflation. Until comparatively recently the Society was, as a Charity, confined to what are known as "Trustee Investments". Now, however, the power of Trustees has been considerably widened, enabling them to hold a proportion of equity (i.e. ordinary) stocks and shares, which constitute a "hedge" against inflation. Further consideration of this problem will be undertaken during the current year.

Another matter which has been started and is still proceeding is an overhaul of the Society's insurances. It is five years since this was last done and considerable changes in value have taken place since then; for example, the value of the Society's Library has increased by nearly 100%, and there has also been a considerable increase in value of the Museum exhibits — previously not insured. It is expected this review will be completed before long — at the moment we are awaiting quotations.

Each year it is the sad task to record the death of members who have given of their best to the Society. Obituaries of three such members appear in these *Proceedings*.

Lectures, Field Meetings and Visits, 1967-68

Lectures open to the public free of charge are shown by the letter P after the date. Degrees and other qualifications are inserted only after the first mention of names.

The programme comprised 59 Lectures, 51 Excursions and Field Meetings, 11 Members' Days and 7 Ciné Subscription Programmes, making a total of 128. The Annual General Meeting, 12 monthly Council Meetings, and regular meetings of Committees were held as usual.

GENERAL

LECTURE		LECTURER
Oct. 14	Presidential Address: Geological Studies in 17th Century England	Prof F. Hodson, PH.D., F.G.S.
Feb. 3P	Projects in Natural History and Biology at Bryanston School	G. D. Harthan, B.A. and 2 sixth-form boys
Feb. 12	Studland Heath Nature Reserve	W. G. Teagle
Feb. 17	Hod Hill: Film of the work done by the Dorset Naturalists' Trust	Mrs. Angela Hughes
Apl. 27	Our Local Heritage	Chairmen of Sections
FIELD MEETING OR VISIT		LEADER
May 7 to 9	Three-Day Field Meeting to North Devon and Somerset	Miss F. M. Exton, B.A.
Aug. 8	Coach Tour of "Hardy" Country	W. C. Thomas

SECTIONS

Archaeology and History Chairman: Mrs. C. Simpson

LECTURE		LECTURER
Oct. 21	The Builders of Silbury Hill	Mrs. C. Simpson
Nov. 18	The Dawn of Civilization: The Food Plants of Man from the Primitive to the Bronze Age	E. Chambers, F.L.S.

Dec. 13	Hengistbury Head: Its use in the past and its attraction today	J. H. Lavender, B.SC., A.R.C.S.
Jan. 24P	The Country Houses of Dorset	R. N. R. Peers, M.A., A.M.A.
Feb. 24	French Cathedrals	S. E. Whitaker, A.R.I.C.S.
Mar. 23	The Archaeology of Music and the Orchestra	F. C. Fildes
May 1P	Some Archaeology of Iraq	Sqdn. Ldr. J. L. C. Banks
June 5	Son et Lumière at the Pyramids	Mrs. C. Simpson
	FIELD MEETING OR VISIT	LEADER
July 4	Muchelney Abbey, Glastonbury and Montacute House	Mrs. C. Simpson
Sept. 4	Forde Abbey and Gardens	"
Astronomy Chairman: C. M. Pither, F.R.A.S., F.I.L.S.		
	LECTURE	LECTURER
Oct. 7P	Tektites	C. M. Pither
Nov. 25	Spiral Nebulae to External Galaxies	W. H. Day, F.R.A.S.
Jan. 6	Astronomical Telescopes	C. M. Pither
Mar. 2	The Spring Sky	"
Botany Chairman: Mrs. A. K. Hunt, B.SC.		
	LECTURE	LECTURER
Oct. 28	Hunting Plants and Pyramids in Mexico	Prof. J. G. Hawkes, SC.D.
Nov. 20	The Flora of Hampshire and its Conservation	Mrs. M. P. Yule
Dec. 16P	Sisal and its Manufacture	Mrs. A. K. Hunt
Feb. 19	The New Forest	W. A. Cadman
Mar. 16	British Orchids	Sqdn. Ldr. J. L. C. Banks
June 26P	Roses and the Rose Family	Mrs. A. K. Hunt
	FIELD MEETING OR VISIT	LEADER
Oct. 3	Fungus Foray — New Forest	Mr. and Mrs. V. T. Pickering
Oct. 31	Autumn Tints — New Forest and Exbury Gardens	Mrs. A. K. Hunt
Apl. 9	Brownsea Island (jointly with Ornithology)	Mrs. A. K. Hunt and Mrs. L. M. Maddox
Apl. 23	Old Railway, Burley-Holmsley	Mrs. O. E. Murch and Mrs. K. D. Killick
May 3	Queen's Bower	Miss E. M. Whitaker
May 13	East Stoke	Miss G. West
May 20	Syon House, Brentford — Garden Centre	Mrs. A. K. Hunt
May 30	Sandy Down — Brockenhurst Old Church	Mrs. Murch and Mrs. Killick
June 6	Selborne	Mrs. A. K. Hunt
June 17	Hengistbury	Mrs. Murch and Mrs. Killick
July 2	Brook — Freshwater I.O.W.	Mrs. M. P. Yule
July 11	Little Picket	Mrs. A. K. Hunt
July 18	South Trigon, Near Wareham	Miss G. West
Aug. 12	Crichel Estate, Wimborne	Mrs. D. E. Withers and Mrs. A. K. Hunt
Sept. 16	The Blue Pool, Swanage	Miss G. West
Geography Chairman: Miss F. M. Exton, B.A.		
	LECTURE	LECTURER
Oct. 23	Some Islands of the Caribbean	A. J. Butcher, F.R.I.B.A.
Nov. 11	Two years in the Antarctic (with Photography Section)	M. Tween
Nov. 15	Life in Some Greek Islands	Mrs. M. Grange-Bennett

Dec. 9	N.W. France and the Loire Valley	Miss F. M. Exton
Jan. 20	Southern Austria and the Dolomites	W. F. Perry, B.Sc.
Mar. 9	Geographical Background of U.S.A.	Miss F. M. Exton
Apl. 10	The Western Mediterranean and Madeira	E. R. Bidder
Apl. 20	North Devon and Somerset — the Area to be visited in May	Miss F. M. Exton
July 31P	Southampton Docks — Past, Present and Future	E. A. Oscroft

FIELD MEETING OR VISIT

LEADER

May 7 to 9	Three-Day Field Meeting to North Devon and Somerset	Miss F. M. Exton
Aug. 27	Wareham	
Sept. 27	Conducted Tour of Southampton Docks and Harbour	W. C. Thomas

Geology Chairman: D. A. Wray, PH.D., M.SC., F.G.S.

LECTURE

LECTURER

Jan. 17	Rocks, Fossils and Minerals	I. M. West, F.G.S., A.I.S.T.
Jan. 31	Fossils and their Uses	"
Feb. 14	Rocks and Rock Structures	"
Feb. 28	Minerals and How to Identify Them	"
Mar. 13	Geology of the Dorset Coast	"
Mar. 27	Geology of the Hampshire Basin	"

FIELD MEETING OR VISIT

LEADER

Apl. 5	Visit to the Geology Department, University of Southampton	D. A. Wray
Sept. 18	Portland Bill, Freestone Quarries and Chesil Beach	"

Photography Chairman: Miss U. M. Ogle

LECTURE

LECTURER

Oct. 9	A Camera Underground	A. E. McR. Pearce, A.I.B.P., A.R.P.S., F.R.S.A.
Nov. 11	Two Years in the Antarctic (with Geography Section)	M. Tween
Nov. 29	This is Dorset	K. Harbridge
Dec. 11	Cottage in Stone — Portrait of a Purbeck Cottage	Miss U. M. Ogle
Jan. 13	Come to Petra	P. W. Clesley
Feb. 12	Studland Heath Nature Reserve	W. G. Teagle, Warden
Mar. 11	Kaleidoscope	Various Members

Physics and Chemistry

Chairman: Miss I. M. Bircumshaw, B.Sc.

LECTURE

LECTURER

Oct. 16	In Tune with the Universe	J. E. Parry, M.A., B.LITT.
Nov. 22	Fuel Cells	D. A. Fanner, M.A., F.R.I.C.
Dec. 18	The Lunar Society of Birmingham	Mrs. I. M. Bircumshaw
Jan. 8	Chemistry and Plant Life	Dr. H. Czéch, M.I.BIOL.
Feb. 10	Weather	W. H. Lee
Mar. 18P	The Chemical Creation of Life	Prof. A. J. Hills, PH.D., D.SC., F.R.I.C.
July 22P	Isaac Newton	Mrs. I. M. Bircumshaw
	FIELD MEETING OR VISIT	LEADER
Aug. 22	British Drug Houses Ltd., Poole	Mrs. I. M. Bircumshaw

Zoology — Entomology**Chairman: Sqdn. Ldr. J. L. C. Banks****LECTURE**

- Nov. 4P Flies of the British Isles
 Mar. 30 Malayan Butterflies and Moths

LECTURER

L. Parmenter, F.R.E.S.
 J. L. C. Banks

FIELD MEETING OR VISIT

- May 22 Hod Hill, Dorset
 June 19 Visit to "Butterfly Farm"
 July 30 Demonstration of Moth Attraction (Sugar/
 Light)
 Aug. 20 Flies/Dragonflies

LEADER

J. L. C. Banks

"
 "

L. Parmenter and
 J. L. C. Banks

Zoology — Mammals**Chairman: Miss K. M. Bennetts****LECTURE**

- Oct. 18 Animal Life and Adaptations in Arid
 Deserts
 Oct. 25 British Mammals, Museum Studies
 Nov. 13 Some Fabulous Monsters
 Jan. 15 East African Safari
 Apl. 6P Mammals and Other Creatures of the New
 World
 Aug. 14P The Badger

LECTURER

J. Bossanyi, B.A., M.I.BIOL.

G. Teasdill, F.M.A.,
 F.R.S.A., F.R.N.S., F.Z.S.
 T. M. Bell, B.A., M.B., B.CH.
 Miss K. M. Bennetts
 E. Chambers, F.L.S.

Miss K. M. Bennetts

FIELD MEETING OR VISIT

- Oct. 13 Deer Stalking
 May 11 Tracking and Watching Mammals
 May 24 Deer Stalking
 Aug. 3 Cranborne Chase for Roe Deer Rut
 Sept. 13 Deer Stalking

LEADER

Miss K. M. Bennetts

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Zoology — Ornithology**Chairman: Mrs. L. M. Maddox****LECTURE**

- Jan. 27 Some Aspects of the Natural History of
 Arne
 Feb. 17 Hod Hill (also under General)

LECTURER

Bryan Pickess

Mrs. Angela Hughes

FIELD MEETING OR VISIT

- Jan. 9 Stanpit Marsh
 Jan. 25 Poole Park and Shore Road
 Feb. 6 The Avon Valley
 Feb. 22 Studland Nature Reserve
 Mar. 7 Keyhaven
 Mar. 21 Hengistbury Head
 Apl. 9 Brownsea Island (jointly with Botany)

LEADER

Mrs. L. M. Maddox
 Mrs. V. Follett
 Mrs. V. Morgan
 W. G. Teagle
 Mrs. L. M. Maddox

Mrs. A. K. Hunt
 and Mrs. L. M. Maddox
 Mrs. L. M. Maddox
 B. Pickess (Warden) and
 Mrs. V. Follett
 Miss G. West
 Mrs. L. M. Maddox

- Apl. 25 Stanpit Marsh
 May 16 Shipstall Point and R.S.P.B. Reserve at
 Arne
 May 28 Durlston Head
 June 14 Kingston Common
 June 27 Linford
 July 9 Abbotsbury Swannery

"
 F. Lexter (Swanherd)
 and Mrs. L. M. Maddox
 Mrs. D. Rossiter
 Mrs. L. M. Maddox
 Miss G. West
 Mrs. V. Follett

- July 24 Uddens and Ferndown Forest
 Aug. 29 Stanpit Marsh
 Sept. 10 Ninebarrow Down
 Sept. 25 Goathorn Peninsula

MEMBERS' DAYS

Chairman: Mrs. N. Sephton

11 Members' Days were held on Wednesdays, at which the following subjects were discussed:— Oct. 11—The advantages of scientific discoveries outweigh the disadvantages. Nov. 8—Some episodes in the 64 years' history of the Society, from the Annual Proceedings. Dec. 20—Souvenirs. Jan. 10—Recalling the Field Meetings of 1967. Feb. 21—Members' transparencies of scientific interest. Mar. 20—Personal impressions of U.S.A. Apl. 17—Specimens shown under microscopes. May 15—Bird and Animal recordings. June 12—Metamorphoses of Butterflies and Moths. July 17—Thomas Hardy. Sept. 11—Members' choice of Natural Science books.

CINE FILM SUBSCRIPTION PROGRAMMES

Organiser and Chairman: J. C. Mitton

Three films were shown on each occasion:— Oct. 4—The Seasons. France is a Garden, Land of the Falling Waters. Nov. 1—The Golden Lands. The Revealing Eye, The Vanishing Coast. Dec. 6—Rivers, To Catch a Rhino, Return to the Island. Jan. 3—Normandy, Water in Biology, The Lonely Places. Feb. 7—Rain Makers, Under the Nullarbor, Chateaux et Rivières. Mar. 9—The Ben Barnas, Africa Awakening, Birds of a Border Estate. Apl. 3—The Hornet Wasp, Beyond the Riviera, Japan—Profile of a Nation. A gap in the March programme was filled by the showing of a silent travel film taken by a deceased member.

Obituaries

WILFRED PARKINSON CURTIS, F.Z.S., F.R.E.S., F.R.H.S.

In the death of Parkinson Curtis, on June 26th, 1968, in his 90th year, the Society has lost the last of its Founder Members. A member of an old Poole family, he lived the whole of his life in his native town, although he practised as a solicitor in Bournemouth until his retirement in 1953. In recent years he very seldom attended the meetings of the Society. The reason for this was that he was extremely deaf, and found it quite impossible to attend lectures or enter into scientific discussions. His main interest was Entomology: he was a noted authority on the British Lepidoptera. He was responsible for the Entomological Section in the *Natural History of Bournemouth and District Handbook* published by the Society in 1914. In conjunction with his brother Harker Curtis, he wrote the chapter on Bird Life. He was made an Honorary Member in 1922.

Parkinson Curtis was elected a member of the Royal Entomological Society of London in 1908. He made many contributions to the Entomological journals, but his major study, on which he had worked for the whole of his life, and which he only completed a few days before his death, was *A List of the Lepidoptera of Dorset*. This was, in fact, a detailed study of the Lepidoptera found in the County of Dorset. His MS. consisted of 650 foolscap pages. A man of many accomplishments, he was a fine landscape painter in oils. His interests included nature-photography, and he was one of the pioneers in this field. In his later years, when field-work was too arduous for him, he took up micro-photography. A keen gardener, he had a beautiful place in Branksome Park, where he specialised in growing rhododendrons.

WILLIAM JOHN READ, M.Sc., F.R.I.C.

The Society has sustained the loss of a first-class scientist in the death of Mr. Read on the 14th October, 1968. Born at Norwich in 1888, he gained a resident scholarship to Banham Grammar School, where he matriculated with first class honours and was awarded a County Council Scholarship to Manchester University, later graduating in science, with first class honours. Subsequently, he obtained the degree of Master of Science and also became a Fellow of the Institute of Chemistry.

Mr. Read's first post was as assistant chemist and bacteriologist to the West Riding Rivers' Board, as he had specialised in water analysis, an interest he was to retain for the rest of his life. Next he was appointed Bacteriologist and Chemist in the County Health Department at Weston-super-Mare.

During the first World War he was commissioned in the R.A.M.C. and served in Salonica with the Mobile Hygiene Laboratory, mainly for water analysis and mosquito extermination. Contracting malaria and dysentery, he returned to England. Later he was engaged in secret work and held important office, including that of King's Messenger and was Mentioned in Despatches.

At the end of the 1914-18 war Mr. Read was appointed Deputy Chief Inspector and Chief Chemist to the West Riding Rivers' Board. In 1923 he joined Messrs. Cooke, Sons & Co., where he rapidly rose to the post of director and remained until the end of the 1939-45 war, during which the factory produced machine tools.

Mr. Read was elected an Honorary Member of the Spen Valley Literary and Scientific Society after having been its President. He was also a member of the council of the Spen Valley Chamber of Commerce and became successively Chairman, Vice-President and President.

Retiring to Bournemouth, Mr. Read joined the B.N.S.S. and immediately became an active member. He gave his first lecture on Hydroponics to the Biology Section and was prominent on all Field Meetings, where his knowledge of micro life was a considerable help. One of his researches was into the problem of ground ice formations on the bed of the Avon and other rivers, an interesting paper on which he contributed to the *Proceedings*.

Within a year of joining the Society he became Secretary, 1945-51. In this post and as Chairman from 1955-57, he is remembered for his business ability and, particularly, as being responsible for obtaining approval for Covenanted Subscriptions—a great asset to the Society.

He was elected President in 1954 and gave his address on "Mankind and Water", a striking example of application of biological knowledge to the practical and vital needs of mankind. In 1967 he was made an Honorary Member of the Society in appreciation of his services.

After coming to Bournemouth Mr. Read was appointed Honorary Consultant to the Avon and Dorset Rivers' Board and investigated the death of trout in the Ibsley Trout Hatchery. He was also in touch with the Test and Itchen Fishery Association for many years.

To all these interests he brought the thoroughness and meticulousness of the true scientist. His keen sense of humour and unassuming personality made him well liked by his contemporaries and all those with whom he worked. To his devoted wife the members extend warmest sympathy.

GEORGE ALEXANDER SHILLIDY, C.I.E.

The Society suffered a grievous loss through the sudden death of Mr. Shillidy on 28th June, 1968. He was the son of the Rev. John Shillidy, M.A., D.D., being born 7th March, 1886 at Surat, India. He was educated at Campbell College, Belfast. In 1906 he returned to India to enter the Indian Police, and thus rejoined his missionary father and his elder brother who was already in the Indian Civil Service, to make a remarkable combined family effort in the service of that country. In 1926 he became Assistant Inspector-General of Police and was Inspector-General in the Province of Bombay from 1935 to 1940. In 1922 he received the King's Medal and in 1931 was made Commander of the Indian Empire in recognition of his service—a fact to which he seldom alluded.

Mr. and Mrs. Shillidy, with their son and daughter, settled in England in 1942. Their only son was killed in action in 1944.

George Shillidy was always proud of his native Ulster descent, but on retirement it was in Bournemouth (after an interval at Oxford and New Milton) that they settled. Characteristically he very soon interested himself in the active younger people of the Bournemouth Rambling Club, of which he became first Chairman and then President. This led him deep into the topography, archaeology and history of Hampshire and Dorset, laying the foundation for further wide and deep study. In 1950 he joined the B.N.S.S. and became a familiar figure at lectures, excursions and other functions. During all his adult life, archaeology was his favourite subject. His first public occasion was a fine lecture on the vanished Indian empire of Mohonjedaro, of the discovery and excavation of which he had intimate local knowledge.

When the post of Secretary fell vacant in 1959, Shillidy volunteered and worked with his usual efficiency. Unfortunately within two years he had to reduce his activities following a severe illness, but he continued till the end to contribute much to the Society. He served on the Council from 1959 onwards, and was a member of the Finance and General Purposes Committee for six years. The renovation of the building, which began in 1961, gave him exactly the opportunity he needed. As chairman of a newly-formed House Committee, and aided by a devoted band of workers, he threw himself into a systematic and thoroughgoing survey of the contents of the building from attic to cellar. The result was that many hidden treasures and records were re-discovered, some of them very valuable. He also compiled a complete list of all bequests made to the Society from its foundation in 1903. During his last years he turned his attention to a detailed inspection of the Reference Library, making a full index of its books and papers. Though always reluctant to occupy the platform he periodically gave interesting accounts of these things in short talks.

George Shillidy was always ready to give active help to any fellow-worker in the Society. He was a very friendly man, one who sought out those members who did not easily make friends—he seemed to know everybody's name. No one took more trouble to make new members welcome or to give time to showing them everything of note in the building. He is sorely missed by very many members. Our deepest sympathy is extended to Mrs. Shillidy and the family.

Reports of Sections for the year ending 30th September, 1968

Library

Increasing numbers of members are using the Library and more books are being borrowed. At the Members' Day on November 8th new members who visited the Library were shown round by the Committee.

By the death of G. A. Shillidy the Library has lost one of its most devoted servants. For the last few years of his life (as is related in the Obituary notice) it was a major interest with him. His fellow workers miss his friendly presence on Tuesday and Thursday mornings when he invariably used to spend two or three hours on the books in the Reference Section.

The Committee wish to record thanks for books presented by members, and especially for those which were presented by the late Mrs. W. Boyd Watt and from the estates of Mrs. Boyd Watt and Mr. W. P. Winter.

H. S. HOLBROOK

Museum

The Museum continues to aim at being an adjunct to the various sections of our Society and the table displays to further interest in these. Several members have co-operated by additions to displays; in particular:— Mrs. V. Follett and Mr. F. C. Faulkener (Mycology), Mrs. L. M. Maddox (Ornithology), Mr. C. M. Pither (Astronomy), Mrs. B. Taylor (Geology) and Mr. F. W. Moss (who produced an immense array of material in connection with a lecture on Hardy). The Museum's collection of fossils also was in demand when Mr. I. M. West, F.G.S., A.I.S.T., gave his series of six lectures on Geology early in the year. All these displays have been augmented by books from our Hon. Librarian.

ACQUISITIONS

1.—1928 3d. piece (Brig. A. B. D. Edwards. 2.—Fossils from Portland (Mr. F. E. Tarrant-Willis). 3.—Rocks (Mrs. B. Taylor): these included a piece of "Desert Varnish"—a common phenomenon of desert regions, a shiny dark brown crust on a rock, probably due to evaporation of water brought up by capillary action containing salts of iron and manganese and chlorides in solution. This specimen came from the Accacia Desert near Khartoum. The thanks of the Society are offered to the donors.

The Curator wishes to thank the Chairmen of Sections for their continued support, Mrs. V. Eaton for regular assistance and particularly for deputising for one month's unavoidable absence, and finally Mr. Graham Teasdill, F.M.A., F.R.S.A., F.R.N.S., F.Z.S., for valuable and friendly help. A closer link with the Russell-Cotes Museum is much appreciated.

N. SEPHTON

Lantern Slide Collection

ACQUISITIONS. Miss Penrose gave a number of slides of British Birds and Mammals. These include a number of slides by such prominent workers in their time as C. J. King, Francis Pitt and W. Farren, as well as Dr. Penrose's own work and the first photographs of the wild British Peregrin. During the year, slides from the Collection have been used by members to illustrate lectures. Some progress has been made in the work of sorting and examining the many slides not previously catalogued, but a lot remains to be done.

J. C. MITTON

Garden

Persistent cold, damp and rainy weather for many months has not been encouraging to gardeners, but thanks to the help of several members the essential routine work has been maintained. Our thanks are due too to Mrs. W. A. Laberge, B.A. and other members for gifts of plants.

W. CHOME

Visiting Panel

Members on the visiting list during the year numbered 12, now reduced to 11 owing to the death of Mrs. F. C. Allen. Of these Miss K. M. Chilver is our oldest member, having joined the Society in 1912. Including the 4 members of the Committee the panel numbers 25.

A. B. D. EDWARDS

Archaeology and History

Seven lectures were arranged this Session, details of which appear on pages 19/20. Also two Field Meetings, and a rendering on records of "Son et Lumière" at the Pyramids. The Section also participated in the composite lecture entitled "Our Local Heritage" to which members of the W.E.A. were especially invited.

We would wish to place on record our thanks to the two visiting lecturers, Mr. R. N. R. Peers, M.A., A.M.A., for his splendid lecture on "The Country Houses of Dorset" which was the inspiration for a most successful Field Meeting to Forde Abbey later in the year, and to Mr. J. H. Lavender, B.Sc., A.R.C.S., who gave us such a wonderful and coherent image of Hengistbury Head, past and present. We are not unmindful of our own member-lecturers, who contribute so much of their time and erudition for our benefit and pleasure; and they, too, are included in our thanks and appreciation. The "Son et Lumière" recording proved so popular that it will be repeated by request. These records were made for the Egyptian Ministry for Culture and National Guidance and the whole project at Gizeh was carried out by world experts of "Son et Lumière". The historical material was arranged by archaeologists of many nationalities and the voices are those of well-known stage, radio and television personalities. As it was not possible to reproduce the "Lumière" part of the proceedings, appropriate slides of Ancient Egypt were shown.

Field Meeting to Muchelney and Glastonbury: at Muchelney Abbey we were able to inspect the Abbot's House, the only part of the Abbey left intact after the Dissolution, and to trace the ground plan of the church. According to tradition, this Abbey was founded by the Saxon King Ine about 697 A.D., and recent excavations have brought to light a Saxon crypt. The Saxon building was replaced by a Norman Church which in its turn was replaced by a larger structure built in the Perpendicular style. When the repairs are completed this Abbey should merit another visit. Glastonbury, in the Vale of Avalon, is so steeped in legend and history that it is almost impossible to extricate the one from the other. According to legend, Glastonbury Tor, 500 feet in height, was originally an island surrounded by marshes and lapped by the River Brue. It was known to the Britons as the Isle of the Dead. It is also the Avalon of the "Idylls" where King Arthur went to "heal him of his grievous wound" in his 6th century war against the Saxons. Arthur's grave was discovered as a result of a monk's dream in 1190. At the spot revealed by the dream was found a hollow log coffin containing the

bones of a very large man. He had 10 wounds in his head with one that had not healed. Another set of bones were those of a woman with golden hair which disintegrated on exposure to air. These bones are thought to be those of Arthur and Guinevere, both reputed to be buried in the grounds of Glastonbury Abbey. Legend also has it that Joseph of Arimathea with 11 others headed a mission sent from Gaul by St. Philip to this country, bringing with him the Holy Grail. The first Christian settlement was a circle of 12 huts and the Holy Grail was allegedly placed in the spring now known as the Chalice Well where the first Christian baptisms took place.

The known history of this Benedictine Abbey begins with the early Saxon chapel of wattle and daub on the site where now stands the Norman Lady Chapel. The first Abbey was built by Henry de Blois, nephew of Henry I. This was completely devastated by fire in 1184 and was rebuilt by Henry II and rededicated in 1303. The Monks, after reclaiming the marshes and employing laymen for farming, became very wealthy. The Abbey was dissolved and wantonly destroyed in 1539, and the Abbot executed on the Tor. Due to the efforts of antiquarians and archaeologists and all who have contributed to its partial reconstruction it is now possible to visualise the grace and splendour of the original structure. The celebrated Glastonbury Thorn which blooms in May and also at Christmas stands in the grounds of the Abbey. Plants grown from the haws of this thorn do not retain the characteristics of the parent stem and can only be propagated by grafting or budding upon other roots. This thorn was common in Palestine. Although alleged to be the staff of Joseph which flowered when he struck the ground, it is more likely to have been introduced by Crusaders.

The second Field Meeting to Forde Abbey and Gardens was of great interest. Originally a Cistercian Monastery, it passed into private ownership after the Dissolution when much in the way of restoration and reconstruction was effected. The Staircase attributed to Inigo Jones, the Refectory with its 15th century collar-beamed roof, the Cloisters and the splendid Tapestries are all worthy of note. The Gardens, especially in the Spring, are of great beauty, the landscape being partly natural and partly artificial, with herbaceous borders and shrubs of azalea and rhododendron mingling with ancient firs and cedars.

All the Lectures and Field Meetings were well attended and the Chairman once again wishes to thank all who have contributed by their interest and support to their success.

C. SIMPSON

THE DAWN OF CIVILISATION PRIMITIVE MAN AND HIS FOOD PLANTS

Abstract of a Lecture by E. Chambers, F.L.S. on 18th November

Man's first needs were food, shelter and clothing, so his slow ascent to civilised life was bound up with plants and their utilisation. Primitive Man was a "hunted" rather than a "hunter" and made up for his weak physique by his cunning mind and an adposable thumb which allowed grip of a weapon and accurate stone-throwing.

When the descendant of Proconsul emerged from the forests where he had shared with other Primates the natural fruits of Palms, Breadfruit, Nuts, Banana, Mango, etc. when available and edible roots and tubers, he found in more open spaces many edible seeds and fruits. Articulate speech allowed co-operation in bands and he probably ousted baboons from their hills and started a new mode of existence. The discovery of cooked flesh from bush fires led to controlled use of fire in food preparation and the budding intelligence of genus *Homo* applied itself to the selection of its "daily bread"—animal and vegetable. On the hills which were the first strongholds of Man the likeliest first source of food was Quinoa and other members of the *Chenopodium* family growing on the poorest ground, easily collected and bruised into a porridge or eaten raw or dried. Species were plentiful from E. Africa to India. Even the true Primitive Man would notice in time that the Quinoa was better in some places than others and hence came the first conservation, not agriculture but protection.

Having left the barren hillocks Man found on better ground members of the *Sorghum* genus. On verges and coppiced glades these were wild crops but when conserved they would hybridise into such forms as Broom Corn and Kaffir Corn.

These occur from Africa round to India so primitive humanity could spread slowly or nomadically and always have a staple diet of Sorghum. Other minor forms of Millet occur right to the Deccan where an *Eleusine* is still tolerated and is certainly the most ancient crop as it never would have been selected after superior grains were known. So Quinoa and Millet types must be regarded as Man's first dry, or as we should say "cereal" sustenance.

Slow drifting arrived at such deltas and estuaries as Euphrates and Tigris, Nile, Indus, Mekong, etc., where fibre-bearing plants, e.g. Hemp, Jute and Manila (*Musa textilis*) produced fisher-folk. The fourth great moment in human development (we noticed speech, the adposable thumb and use of fire) was when a man first twisted two plant fibres into a cord which was lighter and stronger than animal sinew and opened up technique in fishing and navigation. The two Flax species had genuine food and fibre combination. Then emerged woven baskets for storage and an end to hand-to-mouth feeding.

Fortified by rich protein of fish and better carbohydrates, Man pushed up the river basins and discovered new food plants needing conservation, cultivation and storage protection and so a communal life. Chenopodium was joined by Buckwheat, Beans and Pulse, Gourd varieties and, in Asia, some kind of Rice. The Fig preceded cereals as staple food in the Middle East. *Ficus carica* was cultivated as early as B.C. 3,000 in parts of the Fertile Crescent along with Olive, Locust, Tamarind, Beans and, in India, Turmeric, Lentils and other Pulse.

The improvement of many weeds into cultivated food plants is lost in pre-history but is evidence of ancient agriculture. In the 6,000 years of recorded history Man has not added a single major crop to his list of domesticates. All our important food annuals were facts by B.C. 3,000 since when nothing comparable with e.g. Wheat, Maize or Rice has been added to the economic food flora. Either Primitive Man was more skilled as a plant breeder than Modern Man (which is unthinkable) or agriculture had almost incredibly early beginnings which is easier to believe. Man, evolving with his food plants, must have developed some form of agriculture from a time reaching far back into the Pleistocene. In the Mesolithic, in a rapid building-up of deltas and changes of river courses, fisher folk fed themselves without shifting their abodes where middens still indicate centuries of occupation. These are a key role in the origin of cultivated plants. "The history of weeds is the history of Man." The great Vavilov determined primitive original centres of many food plants and described the diverse explosions into wider areas along with Mankind.

Barley was probably the first cereal cultivation which began in Ethiopia and Nepal and became of vital importance in Egypt and Assyria. Was Man first a brewer or a baker? Rye is known to have been a tolerated grain-field weed in Asia Minor. Oats may also have been a weed amongst Emmer or Barley in Neolithic times.

Wheat was a vital factor in the evolution of Man from the near-primitive to the near-civilised. It was far from being a single type of grass rescued for cultivation. Cytology has produced exact evidence of the species combined during the Stone Ages to result in our Wheat. Radio-carbon datings confirm the findings. A kind of wheat-grass (*Triticum*) was first a weed amongst Quinoa, then a denizen of middens, protected, sown and improved into a miserable Einkorn which still survives near the Caspian. A common eastern Couchgrass (*Agropyrum*) hybridised with Einkorn to produce Emmer which, with a variant Persian variety, was the Wheat of Neolithic farmers and now existing only in isolated areas. Probably as much as 6,000 years was covered as far as Emmer. Later, in the Bronze Age, Emmer crossed with a bristle-headed weed grass (*Egilops squarosa*) to make Spelt or Dinkle—the bearded Pharaoh's Corn and Mirable of Ethiopia. A further cross may have given our own Bread Wheats.

Cultivation of Maize and Potato in America and Rice in S.E. Asia, the latter in imitation of Nature's sequence of swamp and drought, inspired the great united enterprise from which resulted the terrace systems of long-lasting empires.

The conclusion is that early Man and his plants developed together up the river basins. Draining effort produced the civilisations of Mesopotamia. In Egypt, where archaeology merged into history as the green strip widened and grain and Onion replaced Dates, irrigation was the spur. The plants which need the greatest effort and intelligence, e.g. the Cereals and Potato, brought Man's advance towards civilisation, whilst the free gifts of Nature such as the Palms left him without incentive and advancement.

Astronomy

Four lectures were delivered during the session. Our thanks are again due to Mr. W. H. Day, F.R.A.S., whose subject was "Spiral Nebulae to External Galaxies". The other three lectures were given by the Chairman. It may be of interest to members to know that he has now built a new 12-inch telescope in his observatory at Christchurch. He hopes that the weather will be kinder than it has been, for occluded skies have prevented the section meetings which had been arranged at his observatory.

C. M. PITHER

THE MYSTERIOUS TEKTITES

Abstract of a lecture given by the Chairman on October 7th

Tektites are small glassy objects which are found in various parts of the globe, and are all, except for the Moldavites which are a beautiful transparent green, blackish opaque in colour. The name tektite, which was coined in 1900 by F. E. Suess from a Greek word meaning 'melted', indicates that their appearance is that of once melted glass; the composition is actually in the region of 70% to 97% silica. The shapes of tektites vary considerably, being spherical, tear-drop, or dumb-bell; others are sometimes button-shaped or cylindrical.

Tektites are found only in certain parts of the world which are within a band of 45° either side of the Earth's equator and are normally found within deposits of sand or gravel. The name is used to describe any such objects no matter where they are found, with additional group names to indicate their location. Below will be found the eight known tektite fields, together with their group names and in some cases their sub-group names:

<i>Main Location</i>	<i>Group</i>	<i>Sub-group Location</i>	<i>Sub-group</i>
Czechoslovakia	Moldavites		
Indochina	Indochinites	Philippines	Philippinites
		Indochina	Indochinites
		Isle of Billiton	Billitonites
		Java	Javarites
Texas	Bidiasites		
Australia	Australites		
West Africa	Ivory Coast Tektites		

It is widely thought that tektites fell to Earth from space, perhaps in a similar way to meteors, but they differ greatly from meteors. They rarely exceed 2 to 2½ inches in diameter and normally weigh from 1 to 100 grams, whilst meteors can range from grains of sand to objects weighing several tons; another difference is that the tektites have non-random distribution, whereas meteors can fall, and do, on any part of the Earth's surface. Laboratory tests indicated another difference, which relates to the speeds of the particles as they pass through our atmosphere, for it was shown that the velocity of a tektite would have been 4½ to 6½ miles per second, whereas the known velocities for meteors are from 7½ to 43½ miles per second.

We have all witnessed the arrival of a meteor into the Earth's atmosphere. Such a "shooting star" appears as a very short-lived burst of light streaking across the sky. Unfortunately no tektite has ever been seen to arrive on Earth; in fact all the tektites which are found today are of very great age. The laboratory test used to give some determination of the age of tektites is the measurement of the build-up of argon —40 from the decaying radioactive nuclide potassium —40. From this the following broad picture has been found: Australites—600,000 years, Indochinites—600,000 years, Ivory Coast Tektites—1,300,000 years, Moldavites—15,000,000 years, Bediasites—34,000,000 years.

The origin of tektites is still much of a mystery, but laboratory tests have shown that they do not contain the radioactive nuclide aluminium —26, which occurs as a result of very long bombardment in space by cosmic rays. Thus it has been estimated that the tektites could not have been in space for more than 10,000 years. In astronomical terms 10,000 years is but a passing moment and it has been worked out that such a period of time as this would mean that the tektites could not have travelled much farther than our own Moon.

The theory then is that the tektites originated on the Moon by the act of some other body striking the lunar surface and causing particles to fly off at a tangent. Whether or not this theory is correct only time can show. Perhaps when man is able to explore the Moon at first hand we may have the answer.

Botany

The full list of lectures and field meetings sponsored by this section can be seen in another part of this edition, but lectures by two visiting speakers merit special mention.

Professor J. G. Hawkes of Birmingham University gave a most interesting talk on the Flora of Mexico of which he has made a special study, particularly with regard to the origin of our common potato, whose wild ancestors are to be found there. In the course of his explorations, Professor Hawkes also saw many ancient buildings, some half buried in vegetation, and he interspersed slides of these among the flower slides, so that the lecture had a most varied interest.

Mr. W. A. Cadman, Deputy Surveyor of the New Forest, also gave us a most informative afternoon when he came to describe to us the organisation and management of the New Forest. He explained that the title "Deputy Surveyor" dated from shortly after 1066 when a Deputy Surveyor for each forest area in Britain was appointed; of these only two now remain and they are directly responsible to the reigning monarch as there is no longer a General Surveyor. We also heard about the upkeep of the Forest, the area which could be planted annually by the Forestry Department, the controlled burning of gorse to provide grazing areas for the commoners' ponies and the new controls necessitated by the great number of people who could now visit even remote areas by car. The amount of litter deposited by these visitors is enormous and its collection and removal has added vastly to the costs of administration; fire hazards have increased too, again raising the cost of precautions.

We are greatly indebted to these two gentlemen and all our other lecturers for giving up their time to provide us with such interesting meetings.

Mrs. M. P. Yule is still busy working on the collection of material for the new Flora of Hampshire which, she reports, is nearing completion. Plans for the compilation of the book and arrangements for its publication are now in hand; it is hoped to publish it in the early 70's.

This section suffered a great loss early in 1968 by the death of Mrs. Winifred Boyd Watt who had always been such an enthusiastic member. During our visit to Selborne we were delighted to find a memorial to her at 'The Wakes', home of Gilbert White.

Mr. V. H. Pickering, M.B.M.S., once again led the autumn Fungus Foray, showing nearly a hundred different specimens and providing much valuable information. We hope he will long continue his leadership. This autumn seems to have been particularly favourable for the development of the Earth Star, *Geastrum triplex*, which has been reported a number of times.

I am very pleased to report that Miss S. Haines has consented to assist me by undertaking the organisation of the summer programme of Field Meetings. This will relieve me of a considerable amount of work and enable me to continue as Chairman of the Section for a little longer, if this is the general wish. We are most grateful to Miss Haines for her offer of help.

PLANT NOTES

Lathraea clandestina. This very attractive parasitic plant has been reported this year from Broadstone. It is an alien, but is constantly appearing in new parts. Its striking lavender colour and complete lack of foliage makes it easy to identify. It is parasitic on the roots of willows and poplars.

The following are reported from the Field Meetings this year: *Pulmonaria longifolia* in great profusion along the banks of the old railway between Burley and Holmsley. The Selborne area provided: *Turritis Glabra*—a species which is rare in the South-West, *Vaccinium oxycoccus*, *Blackstonia perfoliata*, *Gentianella anglice*, *Ornithogallum umbellatum*, *Arum italicum*, a number of orchids, including *Cephalanthera damasonium*, *Herminium monorchis*, *Gymnadenia conopsea*, *Ophrys insectifera*, *Orchis mascula* and *Dactylorhiza fuchsii*. South Trigon Estate provided *Osmunda regalis* and *Aconitum anglicum*.

Members are again reminded that they must not gather flowers which are rare. Suspicion has fallen on our Society for the disappearance of *Turritis glabra* from the site where we visited it. Members of the Hampshire and Isle of Wight Naturalists' Trust will have read in the December News Letter the very urgent appeal on this matter made to all who care for the preservation of rare plants.

A. K. HUNT

Geography

During the year the section had 9 lectures and 4 field meetings. The Chairman would like to thank the lecturers and especially Mr. W. C. Thomas who maintained the section's activities during part of the Summer.

The 3-day field meeting to North Devon in May gave members an opportunity to study the varied and beautiful scenery of Exmoor and of the coastal region from Hartland Quay through Clovelly, Bideford, Barnstaple and Lynmouth to the Quantocks.

Following the practice of the last few years, the Chairman gave a lecture on the geographical background of an area of topical interest, and at another meeting members gave their personal impressions of the same region. This year the subject was the United States of America.

F. M. EXTON

THE ISLE OF WIGHT

The aim of the scientific geographer is to show the relationship between physical conditions and man's activities and the Isle of Wight is especially suited for such studies. This was proved when a party of members spent three days in the island in May, 1967 and found there so much of geographical interest. Although only covering an area of 150 square miles, this small island contains geological formations ranging from the sea and river deposits of the present day to the Wealden beds which are some 140 million years old. The Isle of Wight forms part of the southern rim of the Hampshire basin and until geologically recently was joined to the English mainland. Then the sea broke through the rampart of chalk between the Needles and the Isle of Purbeck, separating the Isle of Wight from the mainland. Three main geographical regions may be recognised.

(1) THE CHALK RIDGE, which extends from Culver Cliff in the east to the Needles in the west. The hills reach over 600 feet in several places and exhibit a typical rolling downland with little surface drainage and many dry valleys. This upland is broken in three places by river gaps of which that of the Medina in the centre is the largest, while those of the East and West Yar on either side are much smaller. The chalk cliffs at both seaward ends of the ridge are steep, with little or no beach, and on the west are continued westwards by the stack formation of the Needles. Here wave action at the base and sub-aerial erosion at the top of the joints have separated large masses of rock. Caves and the Arch Rock in Freshwater Bay are intermediate stages in this process. In the past these dry uplands provided sites for early settlements and there are many lynchets and tumuli, while the Long Stone above Mottistone is reputed to be part of a burial place over 2,000 years old. However, modern man does not find these exposed hills attractive for habitation and there are only isolated farmsteads in some of the more sheltered valleys where arable farming is possible.

The largest settlements are in the gaps. Carisbrooke, with its ancient historic castle, strategically placed to defend the Medina gap, has developed down the slope into Newport which is still accessible to small ships and which is the centre for roads from all parts of the island. During the Middle Ages and even until the end of the nineteenth century Brading in the East Yar gap was a port, for the estuary extended up to the foot of the slope on which the town is built. Then an embankment was built near Bembridge to reclaim the lowland and so Brading was completely cut off from the sea. The small settlement of Freshwater lies in the gap made by the West Yar on the low and narrow strip of land between the river and Freshwater Bay.

(2) THE NORTHERN PLAIN is north of the chalk ridge and here the rocks are mostly sands and clays of the early Tertiary period. These produce a

low monotonous type of country crossed either by short rivers like the Blackbridge Brook and the Caul Bourne which rise in the chalk ridge, or by the lower courses of the longer rivers, previously mentioned, which rise south of the ridge and flow in valleys which are too large for the present streams, thus providing their former greater volume when they rose in a higher area to the south which has now disappeared under the sea. At the east and west ends of this lowland the clays and sands have been worn into bays with low cliffs of which the exposures of coloured sands at Alum and Whitecliff Bays, north of the Needles and Culver Cliff respectively, are of great geological interest. The whole of the north coast has low, often wooded cliffs and wide beaches, but at the mouths of the rivers there are long branching creeks extending some distance inland and fringed with saltings, tidal marshes and mud flats. The soil is generally infertile and the vegetation poor grass and heathland with patches of mixed woodland.

The population is scattered, the larger settlements being on the coast. Yarmouth, with its sixteenth century castle, Fishbourne on Wootton Creek and Ryde are ferry ports for the mainland, while on the Medina estuary are the yachting centre of West Cowes and the ship-building yards of East Cowes. Perhaps the most interesting settlement is the tiny village of Newtown. It is situated on a branching creek at the mouth of the Caul Bourne. It has an ancient charter and until the increase in the size of ships and the silting of the channels, it was a flourishing port with productive oyster beds and salterns.

(3) THE SOUTH. The great Alpine earth movements of late Tertiary times affected this part of England to some extent. The rocks were tilted as can be seen in the almost vertical strata in Alum Bay, and in the south east of the island the chalk formed an upfold to the main ridge. The top of this fold has been eroded to expose the older rocks underneath so that there is a strip of country composed of Lower Greensand from Sandown Bay to Compton Bay, with the still older Atherfield clay along the south coast and behind Sandown. These older rocks give a low-lying, often water-logged, tract nowhere over 200 feet high, contrasting strongly with the dry grassy uplands of St. Boniface and St. Catherine's Downs which exceed 700 feet above sea level. The Lower Greensand cliffs are low and deeply entrenched by chines at Shanklin and Blackgang, while farther west the many chines in the Atherfield clay are less spectacular but are of great interest to the geologist because of the many fossils of both land and marine origin found there. In the south-east from St. Catherine's Point to Luccombe Chine, where the chalk, Upper Greensand and Gault Clay overlie the Lower Greensand, an interesting scenic formation is found. Here the Gault Clay, dipping seawards, has caused the Upper Greensand to fall away in great masses, creating a tumbled strip covered with tangled vegetation between the sea and the vertical face of the Upper Greensand behind. This is best seen in the famous undercliff west of Ventnor.

Along the south coast there are no harbours and it is indeed a treacherous coast where many wrecks have occurred and as the land behind is often too wet for cultivation this coastal strip has not attracted Man; the settlements are inland where spring water is available at the foot of the chalk hills along which there was an ancient trackway. The hill-foot line of villages includes Brook, Mottistone, Brightstone, Kingstone and Arreton, which all show the classic grouping of the village round the church, manor house and farm. The parishes are typically long and narrow extending up to the hills behind and down on to the plain so that each community had a variety of farmland within its borders.

Thus in this comparatively small area it was possible for members in three days to study many different types of scenery and the ways in which Man has utilised the different geographical environments.

F.M.E.

Geology

In the first three months of the year, a series of six lectures on geology were given at fortnightly intervals under the joint arrangement of the Extra Mural Department of Southampton University and our Society. We were fortunate in being able to secure as our lecturer Mr. Ian A. West, F.G.S., A.I.S.T., who is now a member of the staff of the Geology Department at the University, and was formerly resident in Southbourne and at that time an active member of our

Society. In his lectures Mr. West described the leading principles of our science followed by a detailed account of rocks, minerals and fossils which were illustrated by an extensive series of slides and specimens. The last two lectures were devoted to the Dorset Coast and the Hampshire Basin which were of particular local interest. There was an excellent attendance at each meeting, and the lectures, primarily intended to be popular in scope and to appeal to those who had not previously studied geology, were much appreciated.

In March, at the invitation of our President (Professor F. Hodson, PH.D., F.G.S.) a visit was made by motor coach to the new Geological Department at Southampton University. Unfortunately, owing to illness, Professor Hodson was unable to welcome the members himself, who were under the guidance of the Chairman of the Geology Section. The new department, which is not yet completed, was planned by Sir Basil Spence, and one of the most striking features is the handsome and spacious Museum arranged as a Court Yard and floored with blocks of polished Crinoidal Limestone. Adjacent is a Water Garden paved with Portland Limestone and embellished with huge blocks of Shap Granite and other familiar rocks producing a very striking scene. These have been generously provided by the Esso Petroleum Company of Southampton. Many interesting exhibits were on display and during the afternoon Mr. West showed us the remarkable Zeiss Electron Microscope, with a magnification of 1:40,000, which is employed to study rocks and minerals in great detail. Mr. Cosgrave also explained to us the X-Ray Diffractometer as well as the X-Ray (X.R.S.) fluorescent Spectrometer which enables chemical analyses of rocks to be readily undertaken. In company of Mr. Harris we then visited the extensive Rock Department where among other features is a Diamond Saw used to prepare thin film-like sections of rocks for examination and study under the microscope. These several illustrations of the striking advances being made in our science within the past few years proved of great interest to us all.

In September a day's outing was made by coach to Portland under the guidance of Mrs. Sephton and the Chairman of the Section. En route, the party passed alongside the Chesil Beach, one of the most striking and extensive pebble beaches in the country, and probably without equal in the whole of Europe. From the northern end of the Portland plateau there is a superb view of its entire extent, and here the leader described its character and also discussed its probable origin. The party then proceeded to Easton, where one of the foremen of the Bath and Portland Stone Company showed us round the very extensive quarries from which the Portland freestone has been quarried and subsequently employed in many of London's most noted churches and public buildings.

Portland Bill was next visited and here attention was drawn to the succession of remarkable cliffs consisting of massive Portland Limestone; and also to the Raised Beach which overlies them. This ancient beach yields a very distinctive shell fauna and contains many far-travelled pebbles from Cornwall and elsewhere. It is a reminder of the days when the sea-level was at a higher level in relation to the land-surface; probably in Inter-Glacial times. In the afternoon a visit was made to the extensive workshops at Easton, and this proved of considerable interest to the party. Here the Portland freestone arrives in large blocks and is hewn, cut and prepared for a variety of purposes.

The return journey was made by way of Portisham, Hardy's Monument, Maiden Castle, Stinsford and Bere Regis, a brief stay being made to examine the huge swallow hole known as Culpeper's Dish on Bryant's Puddle Common. This depression which is 40 feet deep and more than 100 yards across is primarily the result of sub-surface denudation of the chalk here underlying a thin cover of sand and gravel. The leader pointed out there were upwards of some six hundred swallow holes of varying sizes in this area, and there is clear evidence that some are actually in the process of formation at the present day.

D. A. WRAY

Photography

During the season we had welcome return visits from Mr. A. E. Mc. R. Pearce, A.I.B.P., A.R.P.S., who, this time, took his "Camera Underground" to show the wonders of cave photography. Interesting as his talk proved to be, it is doubtful whether any members would be inspired to follow his example! Mr. Peter Clesly

extended an invitation to "Come to Petra" which, after seeing the rose coloured slides, many would be glad to accept. Other visiting lecturers were Mr. Mike Tween, with a most unusual story of "Two Years in the Antarctic"; Mr. Ken Harbridge with "This is Dorset" and Mr. W. G. Teagle with an "Illustrated Talk on Studland Heath Nature Reserve". The full list of lectures is given in detail on page . Thanks, as always, to Chief Projectionist, Mr. G. Holroyd and his helpers.

U. M. OGLE

Physics and Chemistry

During the past year seven lectures were given covering a wide variety of subjects—details on page 21.

The season opened with a further welcome visit from Mr. J. E. Parry, M.A., B.LITT. (Oxon), M.A. (Wales), who chose as his title "In Tune with the Universe". This was a close-knit lecture, most scholarly, as always from this speaker, and full of original thought. Concentrated attention was called for, but those listeners who were able to follow the lecturer along all the paths of his thought must have felt at the end that many new windows had been opened in their minds, and that they had been enriched by the experience.

Starting with the views of the Greek philosopher Heraclitus, formulated 2,400 years ago, Mr. Parry went on to examine the modern intellectual predicament of the One and the Many. At first sight one is struck by the diversity of things, yet recent developments in molecular biology are emphasizing life's fundamental unity. Whatever may be the ultimate secret of the universe and interpretation of its mystery, our finite experience is that we are living in a world of contradictions and polar opposites which condition our perception. We cannot grasp the idea of light except as the opposite of darkness, of heat except as the opposite of cold. There is a spatial polarity of above and below, within and without, etc., ad infinitum. These opposites produce a tension which is the source of all creative processes. Release from it would lead to a cessation of life. We must co-operate with the inevitable, said Mr. Parry. Either we become problem solvers, and accept each challenge as it arises, or we become outcasts in the Universe.

Another lecture of outstanding interest was given by Prof. A. G. Hills, PH.D., D.S.C., F.R.I.C., of Southampton University, visiting us for the first, but we hope not the last, time. He chose as his title "The Chemical Creation of Life" and foresaw a future in which individualism will be progressively muted. After reviewing age-old beliefs concerning the origin of homo sapiens and the special qualities of human kind, he said that the character of many religious and philosophical disputes was seen to stem from natural ignorance of the processes involved, especially of the basic biochemistry underlying living systems. The patient analysis of chemical and biochemical systems has led to the recognition of the molecular structure, first, of simple inorganic materials, and then of organic, living materials. The elucidation of the structure of alkaloids, hormones, ribonucleic acid and proteins had laid bare the fundamental chemical processes accompanying the reproduction of viruses, and it would seem evident that, while the simplest living creature was extremely complex in its structure, its nature and its properties, it was nevertheless a chemical system subject to chemical laws. The massive impact of chemotherapy on disease had, more than any other factor, changed the future of human kind. The concept of death as a currently prevalent disease was explored in relation to transplants and other revivification measures. The need to regenerate the species in terms of new ideas and new human possibilities was questioned, and it was proposed that future progress might well be wholly that of society and its technological appendages. Investment in material things rather than in human factors was likely, regrettably, to be the principal theme.

The lecturer then went on to examine the "cosmic" view of continuous evolution and showed how, since matter was first formed, the same processes of aggregation had prevailed. Judged by their performance, the amoeba, the molecules, and the men had much in common, and differed only in their degree of complexity. This was not to reduce the significance of man to that of molecules, but perhaps to raise the significance of molecules to that of men. This is close to the philosophy of Teilhard de Chardin, which Prof. Hills defended. Humankind

might well be an end-product of evolution, he said, but unlike the dinosaurs, it was not a blind end. There was no need for pessimism. The fulfilment of the next phase, the complete integration of humankind into a composite society, had limitless possibilities.

New ground was broken by another visitor, Dr. D. K. Ross of the Admiralty Materials Laboratory, Holton Heath, who instructed us on the latest developments in "Fuel Cells", illustrating his extremely lucid lecture with films and slides. Fuel cells are likely to become of increasing importance, both for domestic and industrial use, in the near future.

Of the remaining lectures two were given by members and two by the Chairman. In January, Dr. Hella Czech, M.I.BIOL., a summer member, travelled down from London to deliver a lecture to us on the subject of "Chemistry and Plant Life". She showed how the chemical approach to biological problems had led to fundamental discoveries on the nature of living organisms, and has already yielded valuable practical results. We were given pointers to methods of dealing with the desperate food-shortage in underdeveloped countries, making use of such materials as proteins from bacteria grown on oil or methane (the chief constituent of natural gas), and large-scale cultivation of algae, in particular the green alga *Chlorella*. Dr. Czech's lecture was packed with other interesting information. She spoke as an expert; her easy professional approach to her subject and cheerful presence on the platform, were much appreciated. Another of our members, and a comparatively new one, stepped into the breach at a time of crisis, when Mr. Clark, our well-loved former Chairman, was in hospital following his tragic accident. Because of this he was unable to give the lecture which he had planned on Meteorology, and at short notice Mr. W. H. Lee gave us a splendid talk on "Clouds", treating the subject from many angles, and illustrating it by a large number of his own fine colour slides.

Each of the Chairman's programmes was of an historical nature. In one, she gave an account of the activities of the Lunar Society of Birmingham, a little-known but highly influential scientific society which met regularly in Birmingham from about 1760 to the end of the 18th century. It was a small group, consisting over the years of only 14 members, which included such great names as Joseph Priestley, Matthew Boulton, James Watt, Erasmus Darwin, Josiah Wedgwood, and others almost as famous. More than any other single group, it represented the forces of change in late eighteenth century England, for the Lunar Society was a brilliant microcosm of that scattered community of provincial manufacturers and professional men who found England a rural society with an agricultural economy and left it urban and industrialised. The other programme was on Sir Isaac Newton, one of England's greatest sons. His work and viewpoint changed the current of human thought, and he has been acclaimed by some of the world's finest scientists (including Einstein) as the greatest man of physical science in historic time.

Continuing the series of visits to local places of interest to the chemist, a party spent a most instructive and enjoyable afternoon at the works of B.D.H. Chemicals Ltd. at Poole. The products of this old-established Company, dating back to the 18th century, are famous for their purity, and are exported to every country in the world. In conclusion, the Chairman would like to express her warm thanks to all the lecturers who gave their time so willingly to the Society, and also to the team of projectionists who gave her much valuable help and support.

I. M. BIRCUMSHAW

Zoology—General

PROJECTS IN NATURAL HISTORY AND BIOLOGY CARRIED OUT AT BRYANSTON SCHOOL by G. D. HARTHAN, B.A., Senior Biology Master and two VI Form Science Students

Water Flea. P. H. JARRETT gave an account of his observations on the physiology and behaviour of the Water Flea (*Daphnia*). He described the experiments he had made to determine the reactions of *Daphnia* to varying factors in its environment—temperature, light, oxygen and carbon dioxide concentrations; its rate of heart beat under varying conditions, and his methods of culturing the animal in the laboratory.

African Clawed Toad. T. M. CARO described his work on the African Clawed Toad (*Xenopus*). This included experiments on the rate of growth of the larvae and their feeding, breathing and blood systems.

Earthworms. Mr. G. D. HARTHAN described an investigation made by a boy two years ago on the effect of earthworms on the fertility of the soil, and of the soil on the reproduction of earthworms. Onions were grown in large pots, each pot containing different types of soil and differing earthworm populations.

The talks were illustrated by charts and photographs; living specimens were observed under microscopes.

G.D.H.

Zoology—Entomology

In the United Kingdom it was an adverse year for insects in general, with a heavy rainfall and below average periods of sunshine, preceded by a comparatively mild winter. In addition, all the disadvantages inherent in a steadily increasing population pressure are speeding the attrition of most forms of our wild life, so obvious during the last few decades.

During this Session there were three lectures and four field meetings. On November 4th, Mr. L. Parmenter, F.R.E.S., gave an illustrated lecture on "The Flies of the British Isles". The lecturer explained that Diptera had only two wings and a pair of short knobbed balancers, the Halteres. The great diversity of types and habits were well illustrated. On March 30th, the Chairman, whose subject was "Malayan Butterflies and Moths", had, during three years in the Sundra Islands, collected and observed the Lepidoptera there. He described his researches into the early stages of the "Birdswing" butterfly—*Troponptera brookiana albescens* Roth. He showed slides of the first ovum and subsequent young larva of this species which were the first known to science, and also of the many kinds of survival "simulation" and camouflage found in all forms of the metamorphosis of Lepidoptera. At a Members' Day Meeting on June 12th the Chairman's talk on the "Metamorphosis of Butterflies and Moths" was illustrated by coloured slides and living specimens. He emphasised the complexity of type in larvae and of their pupation habits, as well as the strong tendency of most species to oviposit on one kind of plant only. The interesting association of the British Large Blue butterfly—*Maculinea arion*—with a species of ant was described.

FIELD MEETINGS. Hod Hill, Dorset, May 22nd. The coach party was divided into groups, each with a particular interest in view; the volunteer group leaders were given a short account of the history of the site and a ground-plan of the Roman fort-remains. Due to the cold wind, lack of sunshine and the generally retarded season, no Marsh Fritillary (*Euphydryas aurinia*) was seen and only one male of the early brood of the Adonis Blue (*Lysandra bellargus*). Even the common species were few in number, either at rest or on the wing. Eight species of Orchids were observed, and a common Buzzard (*Buteo buteo*, Linn.) was seen soaring over Hambledon Hill. Butterfly Farm at Over Crompton, Dorset on June 19th. On arrival we were met by two guides detailed to conduct the party. On the "technical" side of the insect farm, we were shown many types of collecting and breeding apparatus, including an ingenious fine-mesh net cylinder, in which are placed the two sexes of a species which it is hoped to pair. If by prodding they are kept on the move, pairing is induced. In the long rooms lined with glass or net-fronted cages were larvae, emerging pupae, laying females and trays containing the ova of tropical, foreign and British insects. We also saw some of the world's largest and most "showy" moths from India, the Sundra Isles, etc. In the labs, members were shown Lepidoptera actually on the boards and being "set". The guides talked on "mimicry" and protective devices, illustrating with actual specimens from their display cabinets.

FIELD OBSERVATIONS. BUTTERFLIES: 48 species were identified by members, 6 being "single sightings". Specimens of the Autumn brood of the Comma (*Vanessa C-album*) were frequent and well distributed. Incidentally this is a case of marked increase in the status of an insect in the U.K., as fifty years ago the Comma was a scarce and very local insect. The autumn immigration of the Red Admiral (*Vanessa atalanta*) was above average but that of the Painted Lady (*Vanessa cardui*) below.

MOTHS: During the short demonstrations of moth "attraction" on the night of July 30th, 1968, under very adverse conditions, the "sugar" patches were visited by one species only, the Herald (*S. libatrix*). 80 species were identified at the M.V. lamp, including 6 different "Prominents", 3 kinds of "Hawkmoth". Unfortunately many species formerly frequent in the Bournemouth area are now comparatively scarce, e.g. the Pine Hawk (*Hyloicus pinastri*), the Puss moth (*Dicramura vinula*), Oak Eggar (*Lasiocampa quercus*). In June the writer noted a male of each of the two species "Lobster" (*Stauropus fagi*) and "Alder" (*A. alni*) resting on walls in East Avenue. It is regretted that most of the former localities of the rare Speckled Footman (*C. cribraria*) have now been destroyed by conifer plantations.

MICRO-LEPIDOPTERA—contributed by Mr. S. C. S. Brown. The recent deepening and dredging of the Moors river at Hurn had caused a fall in the water level on Parley Heath. In consequence the Marsh Gentian, and the "Plume" Moth *Stenoptilia graphodactyla*, whose larva feeds on the flowers, has become scarce. The Tortrix moth *Eulia formosana*, first recorded in Britain in 1947, has spread considerably, and is not uncommon in Bournemouth. *Gracillaria azaleella*, a greenhouse pest on Azaleas, has established itself outdoors in Bournemouth, the only place in Britain where it has done so. *Mnesipatris flicivora* whose larva feeds on the Sporangia of the Male Fern, was described as new to science in 1937, and was discovered in Bournemouth in 1940. It occurs in the Society's garden in Christchurch Road.

ODONATA—In late July 1968, the writer saw a single female of the dragonfly *Libellula fulva* near Cannon Hill. The bog where it used to be plentiful just below the South side of the hill is now a cultivated field! The number of actual species in the New Forest has remained about static but most are much reduced in population. *Anax imerator*, however, has increased and now breeds in most suitable ponds.

The Chairman wishes to thank the lecturers, contributors and members who have helped to enrich the work of the Section.

J. L. C. BANKS

Zoology—Mammals

During the year six lectures and four field meetings have taken place. These are listed on page 22. The Chairman wishes to thank the lecturers. Mr. Chambers very kindly substituted for the Chairman at very short notice.

Professor J. Bossanyi, our guest lecturer, spoke of various adaptations necessary for the survival of animals living in arid deserts, chief of which were conservation of body fluid and, as opposed to this, the loss of body heat. During the heat of the day smallish mammals, including the Kangaroo Rat and the Jerboa, burrowed several inches below the sand where the temperature remained constant. On the other hand, mammals such as Desert Foxes and Hares needing to lose body heat, had developed larger ears and consequently more body surface. A point of special interest concerning the camel was that the hump(s) was a storehouse for fat and not, as generally thought, for water. This fat could be chemically turned into water as required.

Mr. G. Teasdill, Curator of Bournemouth Museums, emphasised the important part which museum specimens played in the education of students of Natural History who had no means of studying animals in their natural habitat. He spoke on mammals, ranging from the tiny Harvest Mouse (*Micromys minutus*), the smallest of the Muridae, to the Fallow Deer (*Dama dama*), the third largest of the Cervidae (*Artiodactyla*) in Great Britain.

Dr. T. M. Bell discussed Fabulous Monsters of fact and fiction, those of the latter class belonging to the realm of mythology and legend, as for example the sphinx, the mermaid and the unicorn. Dinosaur, plesiosaurus, pterodactyl, giant dragons, squids and eels were all dealt with in detail.

Mr. Chambers gave a comprehensive talk on mammals of the New World. These included members of the Cervidae (*Artiodactyla*) ranging from the foot-high Pudu to the massive Moose (*Alces americana*). Particular mention was made of the Howler (*Alouatta*) monkey and the Jaguar (*Felis onca*) the largest of the New World cats. The beaver and its remarkable way of life were fully illustrated by the Society's excellent slides.

During the year four expeditions have been made, three into the New Forest and one into Cranborne Chase (noted for its high quality roe deer), primarily to study Sika deer (*Cervus nippon nippon*) and Roe deer (*Capreolus capreolus*). Last October eleven Sika were seen after their position had been revealed by their call. This is a distinctive whistle unlike the call of any other deer. Wallows made and used by the stags were prominent and also tree fraying. This is often done by gouging out, with the top tine, a piece of bark at a height of 3 feet—usually a conifer is used for this purpose. In Cranborne Chase all the usual signs of Roe deer activities were in evidence—slots, browsing, stripping, scrapes and fewmets. One Roe kid, still wearing its spotted baby coat, was watched for some time.

K. MILNER BENNETTS

THE EUROPEAN BADGER

Abstract of a lecture given by the Chairman on 14th August

The European Badger (*Meles meles*), a member of the family Mustelidae in the order Carnivora, is about 3 feet in length. Its wedge-shaped body is carried on four short but extremely strong legs. The colour is generally grey with a distinctive black and white striped face. Much argument still persists among naturalists as to the time of year at which it mates. Two periods are suggested, from February to April, and from July to September. It is agreed that the birth of cubs is between late January and early April. If, for instance, the last period is the time of mating and the cubs are born between the dates stated, there is a gestation period of almost seven months although the usual time for an animal of its size is around two months. This long term is caused by a delay in the implantation of the fertilized egg, known as the blastocyst, in the uterine wall. One probable reason for this delayed implantation is that after fertilization the corpus luteum, a ductless and temporary gland, does not develop, as in most mammals, to any appreciable size, but remains small and non-secretory until the 5th month. After this it secretes its particular hormone(s), conditioning the uterine wall to accept the blastocyst. Adequate food, blood and oxygen become available by means of the placenta, the embryo develops at a normal rate and after 2 months the young are born, usually 2 or 3 at a birth. The cubs are born blind, measure about 4.5 inches and weigh 3 ounces.

In common with other members of the Mustelidae, the badger has musk glands situated in the anal region. These are operational in excitement, fear and when defending territorial rights. Along the dorsal surface of the skull there is a well developed growth of the inter-parietal ridge of bone and this serves as an attachment for the strong muscles. A further feature of interest is the articulation of the lower jaw, which fits into a groove in such a manner that dislocation of the jaw can only happen if the skull is fractured.

Zoology—Ornithology

In September 1967 Mr. Harris retired from the Chairmanship of this Section and I agreed to take it over from him from the 1st January, 1968.

We are continuing his custom of holding two Field Meetings each month. During the winter months we have concentrated mainly on local marshes, the harbour shores, rivers, and lakes, for geese and duck which migrate south at the onset of cold weather, and also for the many waders which are to be seen on the tidal mud.

Our first visit to Stanpit Marsh in January was hampered by snow and strong winds, but on a second visit on April 22nd we were fortunate to see a single Black Tern flying up and down the river. This tern, which was in its breeding plumage of black and dark grey with conspicuous white under-tail-coverts, belongs to the genus of Marsh Terns which feed by picking up insects from the surface of the water whilst in flight, unlike the Sea Terns which plunge into the water for small fish. The rather uncommon Spotted or Dusty Redshank was feeding on the mud—taller and darker than the common species.

On an interesting Field Day at Ibsley by the River Avon, a flock of 12 Beswick's Swans were seen grazing in the water meadows. This is the smallest of the wild swans and can be distinguished from the Mute Swan by its shorter straight neck and a small yellow area on the bill, which is without a knob. We later visited a nearby lake to watch three pairs of Great Crested Grebe, already

in spring plumage, conducting their elaborate courtship display. We were fortunate to see a female Smew swimming with Shoveller, Mallard and Pochard. The Smew is the smallest of the "saw-bills"—fish-eating duck whose spike-like bills have toothed edges—a genus which includes Merganser and Goosander.

Mr. Teagle, the Warden of the Studland Nature Conservancy Reserve, took us round the Reserve in February, and we were able to study the many interesting exhibits in his Observation Hut.

Also in February Mrs. Angela Hughes brought us her delightful film about Hod Hill, the Dorset Trust Reserve, preceded by a short talk, which was of interest to the Botanists and Entomologists in the audience as well as to ourselves.

In the Spring and Autumn, Field Meetings were arranged to various points where migrating Passerines build up on their way in or out of this country.

Although the Spring of 1968 was cold and wet, with snow falling here in the South as late as April 3rd, the migration of birds to this country was about normal, thus substantiating the present-day theory that it is light rather than warmth that governs their movements. The outward Autumn migration seemed earlier than usual, being well under way in early September. Possibly this was due to the abnormally dull summer, with much less sunlight than usual. On the other hand two of our members saw a Swallow at Sandbanks as late as November 3rd.

We visited Hengistbury Head, Stanpit Marsh, Ninebarrow Down and Goat-horn Peninsula, and fresh ground was broken with a visit in March to the coastal marshes at Keyhaven. We hoped to see Ruffs and Reeves which feed in the wet grass near the harbour. Despite near gale force wind, which made using binoculars very difficult, we found a party of 30—the Reeves (the females) noticeably smaller and more insignificant than the Ruffs. These were still in their sober winter plumage and the male birds had not yet developed the extraordinary and decorative ear-tufts and 'ruffs' of different colours, from which they get their name. This is seldom seen in this country, but a party of Ruffs displaying in the Spring on a breeding ground in, say, a water meadow in Holland, is a truly wonderful sight.

We followed up a most interesting lecture on the Arne Nature Reserve by Mr. Bryan Pickess with a visit to the Reserve on May 16th.

We are fortunate in having a wide variety of habitat within easy distance of Bournemouth, and during the summer we visited the New Forest, Stanpit Marsh, The Lighthouse Downs at Swanage for cliff-nesting sea-birds, the Forestry Commission pine woods near Wimborne, and Kingston Common, where Shelduck breed. The usual breeding-site of these birds is in the neighbourhood of extensive mud-flats at low tide, but very occasionally they choose an inland site, usually near open water. In the case of Kingston Common they must be 8 miles from the nearest sea.

One Coach outing was arranged to Abbotsbury Swannery in July. The coach was full, the weather was beautiful, and Mr. Lexter, the Swan-herd, gave us a most entertaining talk.

At the suggestion of one of our members, who also most generously contributed to the cost, we hired the Royal Society for the Protection of Birds' film, *Birds of Strathspey*, for the afternoon of October 30th. I think everyone enjoyed this magnificent film about a very beautiful and interesting part of the Scottish Highlands.

A project we have in mind for next Spring is to assist in the B.T.O. Ornithological Atlas Scheme, an undertaking to be carried out on the same lines as the B.S.B.I. Botanical Atlas. Unfortunately the Hampshire Organiser did not invite our assistance in time for us to make a start this year, but, as the Scheme is to run for five years, we shall still be able to help in this valuable project. For this, the whole of Britain has been divided into 10-kilometer squares, and every breed of nesting bird will be plotted.

I should like to end my Report by thanking Mrs. Vera Follett for all the help she has given me—without which I should not have taken on the Chairmanship. I should also like to pay tribute to the gallant members of our Section, who have supported our Field Meetings so enthusiastically, with never a grumble, despite the most persistent bad weather. Not a single Meeting has had to be cancelled. I hope they have enjoyed them as much as I have done.

L. M. MADDOX

Presidential Address

Serpents: About Loss of Limbs in Vertebrates

by T. MARSHALL BELL, B.A., M.B., B.CH.

Delivered before the Society on the 12th October, 1968

In Genesis we are told how the Serpent was condemned to "go upon the dust", and for what cause. It is implied that before God's curse he had limbs, but there is no mention of how he had acquired such appendages in the first place. However, before we can discuss the loss of limbs in vertebrate animals (namely Fishes, Amphibia, Reptiles, Birds and Mammals) we must first consider the origin of the two pairs of limbs which they mostly possess.

Outside Russia, I think very few Biologists accept the views credited to the French biologist Lamarck, that living creatures acquire limbs or other characters, by striving after some action which requires them. Instead we believe that living matter has a continual tendency to mutate: that is, to develop changes which will be inherited by offspring, if those changes are not fatal to the animal or plant in which they appear. Whether mutations arise from an intrinsic instability of living matter, or are always caused by outside influences, such as radiation or chemical attack, is uncertain. But in whatever way the change may come, a mutated creature must do its best to suit its behaviour to its altered capabilities, and to make a livelihood helped or hindered by its mutation, or else it will perish and leave no descendants to carry on the mutated line. Development of limbs adds generally to the mobility of their possessor, but offers hostages to fortune when a predator seeks a protuberance to grab, and also hinders a body squirming through narrow gaps. Loss of limbs usually reduces mobility at first, though other mutations may compensate for this; but the loss aids burrowing and also hiding in crevices to escape enemies or surprise prey. It is perhaps significant that nearly all vertebrates that have lost their limbs are carnivorous.

What we believe to be the most primitive relatives of vertebrates to be found today are the Lancelet, Amphioxus, and the larvae of Tunicates, Sea Squirts.

These are not true vertebrates for they have no backbone; but they have a number of features allying them to the vertebrates. There are Gill-clefts in the Pharynx, that is the front part of the Gut, a structure called the Notochord, above the Gut, which serves as a primitive backbone, and a nerve cord above that again. So we must regard them as living survivors of the stem from which backboned animals arose. They have no paired limbs, nor any sign of ever having possessed and lost them.

The next higher group, the Cyclostomes, whose best-known members are the Lampreys, are also limbless; and the pairs of fins or limbs characteristic of higher groups are found first only in the fossils of Fishes, which occur in beds laid down in the Devonian period.

It seems likely, however, that there must have been an intermediate stage, in which a fish-like animal had a dorsal fin passing backward round the tail and dividing at the anus into lateral paired fin-folds, and (in most fish at least) into separate single dorsal and tail-fins. I must admit, though, that I have never heard of a fossil showing this structure, but remains of a primitive fish-like creature, called Jamoytius, found in Silurian shale, has been reconstructed by E. I. White to show a rather different development, in which the lateral fin-folds have no connexion with the single fin of the back and tail.

The majority of typical fish have two pairs of fins, Pectoral and Pelvic, from which the paired fore- and hind-limbs of vertebrates appear to have developed. Many different lines of fish appear to have lost one or both pairs of fins and qualify for the popular designation of eels. Where only one pair of fins is lost, it appears an invariable rule that the hind or pelvic fins go and the fore or pectoral fins remain. There may, however, be a catch here, because in some fish the origin from which the pelvic fins develop has moved so far forward as to be nearer the front of the animal than the pectoral fins.

The Moray Eel, which lives in holes or crevices in rocks, has lost both pairs of fins. Part of its success is due to the compensating acquisition of a venomous bite.

The Common Eel, which haunts our streams and rivers in the middle of its life-span, retains its fore- (pectoral) fins and has small scales embedded in the skin, as contrasted with the Moray and the Conger, which are scale-less. Pipe fishes and Sea Horses have lost pelvic fins, and most of them have developed an eel-like form. In many other fish, however, this shape is accompanied only by reduction of pelvic fins and a migration of them forward, to lie almost below the jaws. Such are the Sand-eels, the Ribbon Fish, and many others.

What, however, is characteristic of "Eels" in general is the double bend. The characteristic mode of swimming of active fish, with two pairs of fins, is a single S-bend. Eels, the serpentine fishes, have elongated bodies and a double S-bend as their swimming movement. Sea-horses are an interesting exception to this rule. They have lost the pelvic fins, but swim with the body vertical, by a sculling action of the dorsal fin.

One genus of Crossopterygian fish, *Calamoichthys*, a living fossil allied to the recently discovered *Latimeria*, has lost its pelvic fins. This fish, and its ally *Polypterus*, are sluggish lung-fish. I remember seeing one in the London Zoo Aquarium, and although it had an eel-like shape, I can remember nothing about its mode of swimming. When I saw it, it hardly moved at all. Like *Latimeria*, the famous *Coelacanth*, the fins of Crossopterygian fish are carried on short, fleshy limbs, and it is most likely that from this group there developed, in the late Devonian period, the earliest Amphibia, and through them all the groups which we (being ourselves members of one such group) like to call the Higher Vertebrates.

Although some Amphibia, such as Frogs and Toads, have well-developed limbs adapted for leaping, many others have limbs either reduced to, or never developed beyond what amount to points of purchase on the ground. They move by swinging the spine in an action similar to that of a swimming fish. However, one group of Amphibia, occurring in South-east Asia, have entirely lost their limbs. These are the *Caecilia*, or *Apoda*, worm-like creatures who compensate for their loss of legs by leading a burrowing existence.

As a help in surviving thus, they have retained small scales in the skin and a much solidier skull than other living Amphibia. Both these characters were present in the primitive *Stegocephalia*, the earliest land vertebrates, as they were also in those fish from which we believe these Amphibia arose. Frogs, Newts and most other modern Amphibia have all lost scales and have very sketchy skulls. Their retention of limbs has enabled them to survive such losses. *Caecilians* have not been handicapped by the fact that their eyes have been almost or entirely lost. Eyes are anyway of little use to a burrowing creature. They have replaced sight by information provided by a sort of short tentacle they have developed on either side of the front of the head.

Now we turn to the Reptiles and the group of "Serpents" par excellence, the Snakes.

The sub-Order *Ophidia*, the snakes, appear to have developed from lizards which lost their legs, probably taking refuge at first by burrowing, and then were saved and enabled to diversify by a number of compensating mutations.

First I would mention a lizard we all know, the Slow-Worm, or Blind-Worm, neither slow, nor entirely blind, nor a worm. This lizard has lost its limbs and survived by developing no more than a dusky colouration, a slender form, and capacity for keeping among the grass-roots. They have kept alive but are members of a small and not very successful group.

True snakes have almost all entirely lost all four limbs. But we must not suppose that the lizardish ancestor of the snakes lost two pairs of good limbs suddenly in one generation. We are forced to believe that the limbs were gradually reduced by a series of unfavourable mutations during a long period while some strains so afflicted developed other favourable changes, allowing the pre-snakes to survive and propagate. Members of the group *Boidae* (the Boa-Constrictors and Anacondas) and a few others retain some internal structures of the hind-limbs and a visible external claw at each side of the cloaca. These claws, rudiments of limbs, are better developed in the males than in females, and are not used for locomotion but only in mating.

It seems that when the lizard-like ancestors of snakes lost their limbs and took to a burrowing life, they were able thus to avoid extinction when they also lost eyelids and the nictitating membrane. This last structure is the "third eyelid"

which most of us have observed flicking across the eye of domestic fowls. The eyes of snakes are now covered by a transparent scale, which is shed each time the creature casts its skin. The ear-drum and middle ear cavity have also gone, and snakes appear to have no hearing for sound vibrations in the air. These are all mutations which would aid, or at least not hinder, burrowing life.

As compensation for loss of limbs, they have developed, as have nearly all other groups so handicapped, a greatly lengthened spine. We have 33 vertebrae or, allowing for those parts of the spine where several vertebrae have fused, 26 separate bones in our spine. Snakes have up to 400. This restores mobility to the degree that Mambas and egg-eating snakes can travel freely through the branches of trees. As a contribution to slimness of body, the left lung has been reduced in size and in many species been entirely suppressed. The kidneys lie one in front of the other, instead of being side by side as in quadrupeds. Then, as an additional aid, they have been helped by development of a row of hinged, backward-pointing scales on the ventral side of the body. These give an additional grip on whatever surface the snake is travelling over, and probably account for the superior mobility of the Adder, say, over the Slow-worm. I once saw a Slow-worm trapped in a shallow, smooth pot drainage trough in a garden. It was quite able to escape when lifted on to level, rough ground; but I feel sure an Adder or Grass-snake could have got out unaided.

The next most important mutation which has aided the Snakes, is the loosening of the jaws. The two halves of the lower jaw are joined by an elastic ligament, and the joints onto the skull, at the back of the jaws, allow the mouth to open so widely that most snakes can swallow prey larger than the unstretched circumference of their body. Snakes have in many cases fairly good eyesight, good enough in the spitting snakes (the Spitting Cobra and one or two others) to aim at an aggressor's eyes. Though hearing is apparently lost, sense of smell is acute, and the flickering tongue carries scented particles into the mouth, where they are tasted in Jacobson's organ, a sensory pit in the roof of the mouth. Rattlesnakes and Pit-vipers have on the front of the head a pair of organs which are not paralleled, so far as I know, by any other vertebrates, pits sensitive to infra-red radiations, enabling their owners to detect warm animals in the dark. Of course the principle here is analogous to a lady holding a flat-iron a few inches from the cheek to test its heat, but in degree it is in quite another class.

Some snakes, like Grass-snakes, merely seize their prey as any lizard might do and, aided by backward curving teeth, swallow it whole and trust to asphyxia and digestive juices to kill it in the stomach. But others, the Boas and Pythons, make use of their length and the mechanical advantage of their form of musculature to compress their prey so that it dies from inability to draw breath and be swallowed at leisure.

However, the real speciality which accounts for most of the wide distribution of snakes is a series of mutations which have turned certain teeth into syringes and salivary glands into producers of deadly poisons. In some snakes, several back teeth serve as fangs; a pair of front teeth, a more efficient arrangement, are developed in Sea-snakes and Cobras, and in a third group, Vipers and Rattlesnakes, is the most specialised arrangement. A pair of front teeth serve as fangs and are hinged so that they lie flat along the jaw when the mouth is closed, but are erected when the mouth is opened wide to strike. The actual venom appears, as I have said, to be modified saliva and the poisonous chemicals are classified as:

1. Neurotoxins, which paralyse.
2. Haemorrhagins which destroy the lining of blood vessels and cause bleeding.
3. Anticoagulants.
4. Thrombase which causes blood to clot.
5. Haemolysins and cytolytins which destroy living cells in the blood and body tissues.
6. Digestive enzymes, probably not clearly distinguishable from the last group.

Different species of snakes have varying proportions of several of these, so that snake-venoms tend to be very complicated mixtures of chemicals—Cobras kill mainly with Neurotoxins, producing paralysis; Vipers and Rattlesnakes by Haemorrhage and Tissue Destruction, but Russell's Viper venom contains so much blood-clotting factor that it is used as a life-saving remedy in cases of Haemophilia, in which disease natural clotting of blood in wounds is defective.

Of course other vertebrates produce venom. An American lizard, *Heloderma suspectum*, has a venomous bite, and the male Platypus has poisonous spurs on the hind feet, but venom is of less importance in creatures that have limbs to hold struggling prey and, apart from Snakes, it is a rarity.

Now, for completeness, we must turn to the remaining two groups of Vertebrates—Birds and Mammals. In Birds, none have been found that have survived loss of both hind limbs, though small birds, as individuals, can survive quite well the accidental loss of one leg and, in the Swifts, the legs are reduced to the point where take-off from level ground is impossible. But quite a lot of birds have lost or degenerated fore-limbs, wings, to the degree that flight is impossible.

A primitive toothed sea-bird, whose fossils have been found in cretaceous deposits, appears to have entirely lost its wings. It is no more. The Great Auk and the Dodo both survived for some time loss of adequate wings, but they too have succumbed to competition from more active creatures. Penguins have lost flight, but their wings remain adequate as flippers for swimming, and they have survived successfully by confining their life to the sea, and to lands whose island smallness or whose severe Antarctic climate have preserved them from active land predators.

The main group of birds in which the fore-limbs, wings, are almost or entirely lost, is the Ratitae, the Ostrich and its kin. Most of this group, which lost flight very early in the bird evolution, have survived by virtue of mutations which have given them powerful legs. The Ostrich can run as fast almost as any mammalian carnivore, and its kick has been favourably compared to that of a mule. The Emu and Cassowary can also give a good account of themselves. I have never heard of the South American Rhea's powers of self-defence but they, also, are good runners and large carnivores are uncommon on the Pampas, where Rheas live. Probably the chief enemy of the Ratitae is man, who almost certainly killed off the *Aepyornis* in Madagascar and the Moa in New Zealand.

Generally speaking, loss of fore-limbs in birds is an unfavourable mutation which cannot be fully compensated, and leads slowly to extinction wherever there is competition from carnivorous quadrupeds, let alone man.

Lastly Mammals. Two groups have lost hind limbs, the Whales and the Sea-cows or Syrenia. Both of these groups appear to have lost the legs after returning to life in water. In the sea, a stream-lined body, with a tail-fin to give a grip on the water, is more important than limbs. In fact, limbs adapted for swift running are a positive hindrance. The Syrenia have been adapted to aquatic life by acquisition of a flattened tail and flippered arms, but otherwise by little change. The group has spread widely geographically, but has not diversified. A point which may be significant is that the group is herbivorous while most other vertebrates which have lost limbs are carnivores. Steller's Sea Cow is recently extinct; Dugongs and Manatees appear to be on the way out.

The Whales are often divided into two Orders, the Toothed Whales and the Whalebone Whales, but I shall consider them together. The wide radiation of form in the group, shows it to be a much more successful type and they have survived by a number of favourable mutations. The fore-limbs have become flippers and a wide tail-fin has developed. This, like the smaller tail-fin of Syrenia, is horizontal instead of vertical, which shows it to be a completely fresh mutation and unrelated to the vertical tail-fin of Fishes and the vertical narrowing of the tail of Sea-snakes. A thick coat of blubber aids streamlining and protects from the cold of the sea. Internal developments have occurred which save the Whales from getting the "bends" when they surface from a deep dive. We are still uncertain about these, but they may be connected with a big blood volume and, of course, whales can hold their breath for a long period and do not, cannot, breathe air at high pressure under water, as a human diver must do. Toothed whales have been able to revert to the peg type of tooth which seems most useful to most underwater feeders, and mutations have given the Whalebone Whales a filter for extracting plankton from the water which is very efficient.

But perhaps the most important mutations are those associated with the central nervous system. We know that Dolphins have a system of sonar location, at least as good as that of bats, and they have a brain equal to making full use of this. The small Whales—Dolphins have been studied particularly—have large brains in relation to their body size, and in complexity are comparable to those of men. They are probably the animals next to man in mental ability, more

intelligent than Chimpanzees, who were previously considered man's nearest rivals. The great whales have much bigger brains than men. Well, of course, they have much bigger bodies, but it is just possible that if we ever learn to communicate with them, and don't exterminate them before we can do so—and steps in the direction of learning to communicate with Dolphins are making progress—if we do learn to communicate with the great whales, we may find they regard us, as we regard, say, Rattlesnakes, as highly dangerous but not particularly bright creatures. We had better not be too conceited.

One other group of Mammals, rather an anti-climax, deserves brief consideration. The Mustelidae—Stoat, Weasel, Mongoose, Otter, etc.—appear to be in an early stage of approaching a serpentine form. The legs have become small in comparison to the length of the body. Active running by leg movement tends to be replaced by what Lewis Carroll must have meant by gallumphing, a vertical folding and extension of the spine, with the legs used only to grip the ground. If they survive man's dominance for another one or two million years, surely some of their species will have lost limbs altogether and become mammalian serpents.

To conclude, I hope I have shown how many different groups of vertebrates have survived loss of such apparently important features as limbs, and by making use of those compensating mutations they have received have made a success of life.



PUBLICATIONS RECEIVED

The following publications were received in the Library during the year. Some of them were gifts from members who subscribe personally to the particular Society. The Library Committee are glad to record their appreciation of such gifts.

1. Publications issued by a Society

Birmingham Natural History & Philosophical Society—*Proceedings*.
Botanical Society of the British Isles—(1) *Watsonia*, (2) *Proceedings*.
Bristol Naturalists' Society—*Proceedings*.
British Association for the Advancement of Science—*Science*.
British Deer Society—*Deer News*.
British Trawlers' Federation—*Report and Pamphlets*.
British Trust for Ornithology—(1) *New Bulletin*, (2) *Bird Study*.
California Academy of Sciences—*Proceedings*.
Cambridge Antiquarian Society—*Proceedings*.
Carnegie U.K. Trust—*Annual Report*.
Cotteswold Naturalists' Field Club—*Proceedings*.
Council for Nature—(1) *News for Naturalists*, (2) *Habitat*.
Croydon Natural History & Scientific Society—*Proceedings*.
Dorset Natural History & Archaeology Society—*Proceedings*.
Fair Isle Bird Observatory—*Annual Report*.
Fauna Preservation Society—*Oryx*.
Hampshire Field Club & Archaeology Society—*Proceedings*.
Hampshire Field Club: Ornithological Section—*Bird Report*.
Hastings Natural History Society—*Journal*.
Hertfordshire Natural History Society—*Transactions*.
Historical Association—*Pamphlets*.
Isle of Wight Natural History & Archaeological Society—*Proceedings*.
Linnean Society of London (Botany)—*Proceedings*.
Lloyd Library & Museum, Cincinnati—*Lloydia*.
London Geologists' Association—*Proceedings*.
Men of the Trees—*Trees and Life*.
National Coal Board—*Coal Quarterly*.
National Trust—*News Letter*.
North Gloucestershire Naturalists' Society—*Journal*.
Osaka Museum, Japan—*Bulletin*.
Royal Commonwealth Society—*Journal*.
Royal Horticultural Society—*Journal*.
Royal Society for the Protection of Birds—*Bird Notes*.
Senckenbergischen Naturforschenden—*Natur und Museum*.
Severn Wildfowl Trust—*Annual Report*.
Smithsonian Institution, U.S.A.—*Annual Report*.
Société Jersiaise—*Annual Bulletin*.
South-Eastern Union of Scientific Societies—*Proceedings*.
South London Entomological & Natural History Society—*Proceedings and Transactions*.
Torquay Natural History Society—*Transactions and Proceedings*.
Tromsø Museum, Norway—(1) *Astarte (short papers)*, (2) *Acta Borealia*.
Uppsala University, Sweden—*Acta Phytogeographica Suecica*.
U.S. Information Service—*Pamphlets, Science Horizons*.
West Wales Naturalists' Trust—*Nature in Wales*.
Zoological Society of London—*Newsletter*.

2. Periodicals received

Nature, *British Birds*, *Antiquity*, *Geographical Magazine*, *Animals*, *Science Journal*.

The Bourne Press, 3/11 Spring Road, Bournemouth

